Pacific Insects Monograph 19: 1-158 **1968**

THE PERIPSOCID FAUNA (PSOCOPTERA) OF THE ORIENTAL REGION AND THE PACIFIC[1]

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Abstract: The characteristics of the family Peripsocidae and of its 5 constituent genera are summarized. A check list summarizing the distribution of 107 peripsocid species of the Oriental Region and the Pacific area is provided. Fifty-seven new species are described, 23 from material of both sexes, 22 from ♀♀ only, and 12 from ♂♂ only. Two species are redescribed, and additional information on genitalic characters is provided for 8 species. Certain species groups are recognized, and their characteristics described.

INTRODUCTION

Historical

Kolbe (1880) divided the psocids into 5 tribes, 1 of which was the Peripsocini containing the

[1]This monograph was published with partial financial assistance of the U. S. National Science Foundation (GN-745).

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single genus *Peripsocus* Hagen 1865. Kolbe designated the tribe as follows:

"*Corpus alis quatuor instructum. Alae anticae cellula postica destitutae; nervatura ceterum ut in Caeciliinis, praesertim in Caecilio. Caput ocellis quatuor instructum. Maxillarum mala interior apice aequaliter subbifido. Labrum antice utrinque rotundatum, medioque supra emarginatum ut in Elipsoco (Peripsocus phaeopterus Steph.) aut angulis anticis subobtusis, margine antico medio integro (Peripsocus alboguttatus Dalm.). Tarsi biarticulati. Species hujus Tribus in arboribus habitant.*"

Enderlein (1901) erected the genus *Micropsocus* under the Peripsocini and later (1903b) included *Peripsocus*, *Micropsocus*, and *Ectopsocus* McLachlan 1899 within a subfamily, Peripsocinae, of the family Caeciliidae. No definition of this subfamily was provided. However, from the keys included here it can be deduced that the Peripsocinae was envisaged as including those genera of psocids which have 2-segmented tarsi and lack the areola postica in the fore wing, of which the venation was otherwise that of *Caecilius*.

Pearman (1936) designated the family Peripsocidae without definition and cited the genera *Peripsocus* and *Ectopsocus* as examples.

Roesler (1944) reduced Pearman's Peripsocidae to subfamily rank and included it in the Pseudocaeciliidae, which was expanded to include 5 of Pearman's families, and which has not since found general acceptance (for example, see Badonnel 1951). Within the subfamily Peripsocinae, Roesler included, in addition to *Peripsocus*, the genera *Notiopsocus* Banks, 1913 and *Kaestneriella* Roesler, 1943. He included *Ectopsocus*, with which *Micropsocus* was synonymized, in a separate subfamily, the Ectopsocinae which was also included in the large group Pseudocaeciliidae.

Peripsocopsis Tillyard, 1923, erected for 3 species from New Zealand, was synonymized with *Peripsocus* by Roesler (1944). *Chaetopsocus* Pearman, 1929 was originally believed to be allied to *Trichopsocus* and was later (Pearman 1942) synonymized with *Ectopsocus*, although Zimmerman (1948) maintained the distinction. Edwards (1950) erected *Interpsocus* for a single Tasmanian species (*I. brunneus*) which differed from previously known *Ectopsocus* species in a number of respects—hind wing venation, penis frame structure and female gonapophyses. We have examined species which possess the same peculiarities of the hind wing (*E. crinitus*) and of the penis frame (*E. decoratus*) but which otherwise are clearly assignable to *Ectopsocus*. Moreover, we do not regard the gonapophyses structure, from Edwards' figure, as being sufficiently unusual to warrant the maintenance of a separate genus. We thus regard the species in question as an unusual species of *Ectopsocus*, and *Interpsocus* as a synonym of *Ectopsocus*. These views are supported by studies in numerical taxonomy which will be reported upon elsewhere.

Badonnel (1951) followed Pearman in placing *Ectopsocus* and *Peripsocus* together in the family Peripsocidae and summarized the family's characteristics; Badonnel later (1955) included the genera *Ectopsocopsis* Badonnel 1955 and *Notiopsocus* after making a thorough study of African species of the latter genus on which information previously was scant.

The present situation then, is that although the family Peripsocidae has not been formally defined, the following genera may be accepted for inclusion: *Peripsocus*, *Ectopsocus*, *Notiopsocus*, *Kaestneriella*, and *Ectopsocopsis*, although Roesler clearly was of the opinion that *Ectopsocus* warranted separation from *Peripsocus*, *Notiopsocus* and *Kaestneriella*. This opinion was supported by Thornton (1962) who placed *Peripsocus* in the Peripsocinae and *Ectopsocus* and *Ectopsocopsis* in the Ectopsocinae, within the family Peripsocidae.

The distinctive characteristics of the family and the genera included within the family are summarized below.

THE FAMILY AND CONSTITUENT GENERA

Family PERIPSOCIDAE Pearman

A family of the suborder Psocomorpha. Antenna 13-segmented, setose. Labial palp 1-segmented; maxillary palp 4-segmented, apical segment elongate. Three ocelli. Usual head pattern of small grayish brown spots on either side of sagittal suture, mesial to orbit, and along posterior margin of vertex. Clypeus with oblique striae.

Prothorax small, concealed. Tarsi 2-segmented; hind coxa usually with complete Pearman's organ; basal segment of hind tarsus with a row of ctenidiobothria, apical segment without. Claw with or without preapical tooth, with pulvillus and basal hair. Fore wing: pterostigma free, *rs* and *m* meet at a point, fuse for a length, or are united by a short cross-vein; *rs* 2-branched, *m* 2- or 3-branched; cu_1 unbranched, hence areola postica absent; margin and veins setose or bare (cu_2 usually hyaline and bare). Hind wing: *rs* and *m* fused for a length, or united by a cross-vein; *rs* 2-branched, other veins unbranched; veins bare, margin setose or bare.

♀. Subgenital plate with 1 or a pair of apical lobes; gonapophyses usually complete.

♂. Hypandrium usually simple, setose; penis frame structure and shape variable; radula sclerite present in most species; tergite 9 ornamentation common, in form of apical comb and anterior tubercles. Epiproct and paraproct with no appendages, not ornamented; paraproct with basal field of trichobothria.

A number of species infest houses. Egg-laying habit varied: bare, singly or in a group; either covered with a web or with dark cement.

Sexual dimorphism exhibited in a large number of species, expressed as thicker antenna with denser setae, and larger eyes, in the male.

Tendency towards brachyptery with attendant reduction or loss of ocelli and reduction in number of tarsal ctenidiobothria and paraproct trichobothria.

Genus **Peripsocus** Hagen

=*Peripsocopsis* Tillyard, 1923

Head and body without long setae. Pearman's organ complete. Claw with preapical tooth, filamentous pulvillus and basal hair. Fore wing broadened subapically, margin and veins bare. Veins *rs* and *m* united for a length; *m* 3-branched, pterostigma broadened subapically. Hind wing bare, veins *rs* and *m* fuse for a length.

♀. Subgenital plate with median apical lobe, rarely bi-lobed. Gonapophyses complete: ventral valve styliform, with apical recurrent setae; dorsal valve well developed, largest of the 3, with apical field of setae and sometimes spines; outer valve small, less than 2/3 length of dorsal valve, often reduced, setose.

♂. Hypandrium simple, apex convex, rarely bi-lobed. Penis frame closed, outer parameres fused, produced apically to a beak; radula sclerites symmetrical in arrangement. Tergite 9 occasionally with small caudal comb. Paraproct with variable number of trichobothria, but always more than 10.

Sexual dimorphism the rule. Brachyptery in a number of species. Eggs laid in clusters covered with dark cement. Mainly outdoor species.

Genus **Ectopsocus** McLachlan

=*Chaetopsocus* Pearman, 1929
=*Interpsocus* Edwards, 1950
=*Micropsocus* Enderlein, 1901

Head and body with long setae. Claw without preapical tooth, with lamellate pulvillus and stiff basal hair. Fore wing hardly broadened subapically, apex bluntly rounded, veins with single row of setae; margin often setose (except anal margin); pterostigma oblong, veins *rs* and *m* meet at a point, or fused for a short length,

or united by a short cross-vein; *m* 3-branched. Hind wing with marginal setae between *r* veins; veins *rs* and *m* usually united by a cross-vein.

♀. Subgenital plate usually bi-lobed apically, rarely with median lobe, carrying apical setae; a row usually of 6 large subapical setae on main plate. Gonapophyses usually complete: ventral valve styliform or broadened basally; dorsal valve small, triangular, hidden by ventral valve; outer valve well developed, elongate, with a field of apical setae. (Both ventral valve and dorsal valve reduced in *briggsi* group, dorsal valve completely absent in 1 species). Paraproct with median transverse row of large setae, mesial marginal spine, and field of 8 trichobothria and a simple seta.

♂. Hypandrium simple, apex straight, sometimes with lateral hooks or sclerotized apical lobe; penis frame open anteriorly with lateral slit, or tubular; inner parameres often fused; radula sclerites irregular, asymmetrical, absent in a few species. Tergite 9 usually with apical comb of strong teeth, a number of species with anterior group of tubercles, and other patterns of sclerotization. Paraproct with a median large seta, a mesial marginal spine, and a field of 8 trichobothria and a simple seta.

Eggs laid bare, singly or in clusters covered with a web. A number of species infest houses. Sexual dimorphism not prevalent, exhibited in a few species only. A number of species are brachypterous.

Genus **Ectopsocopsis** Badonnel

Head and body with long setae. Claw without preapical tooth, with lamellate pulvillus and stiff basal hair. Fore wing hardly broadened subapically, apex bluntly rounded, veins with single row of setae; margin setose in some species; pterostigma oblong, veins *rs* and *m* meet at a point, fuse for a short length, or are united by a short cross-vein; *m* 3-branched. Hind wing bare, veins *rs* and *m* united by a cross-vein.

♀. Subgenital plate usually prolonged apically by a membranous and bare median languette. Gonapophyses reduced to rudiments of outer valves carrying 4 large setae each. Paraproct with median transverse row of large setae, mesial marginal spine, and field of usually 8 trichobothria and a simple seta.

♂. Hypandrium simple, apical margin straight; penis frame open anteriorly with lateral slit; inner parameres fused in some species, radula sclerites irregular, asymmetrical. Tergite 9 usually with apical comb of strong teeth, tubercles, or other complex copulatory organ.

Genus **Notiopsocus** Banks

Fore wing hardly broadened subapically, veins setose with a single row of setae, margin setose; pterostigma setose, broader apically with rounded apex. Veins *rs* and *m* meet at a point or fuse for a length; *m* 2-branched, fork small; cu_1 not reaching margin. Hind wing margin setose from r_{2+3}; veins *rs* and *m* fuse for a length. Pearman's organ absent. Claw without preapical tooth, pulvillus slender.

♀. Subgenital plate rounded apically. Gonapophyses: ventral valve short, conical; dorsal valve fairly well developed; outer valve reduced, sclerotized, with a single apical seta.

Paraproct with a variable number of trichobothria (more than 10), and a small conical marginal spine.

♂. Genitalia unknown.

Genus **Kaestneriella** Roesler

Fore wing broadened subapically, margin setose in basal 1/2; veins, including cu_2, setose, with 1 row of hairs except *r* with several rows; isolated hairs within pterostigma and on membrane; veins *rs* and *m* fuse for a length; *m* 3-branched, cu_1 not bent subapically; pterostigma broadened subapically, apex smoothly rounded. Hind wing bare; *rs* and *m* fuse for a length.

♀. Genitalia unknown.

♂. Penis frame closed anteriorly, outer parameres fused and produced to a posterior beak. Radula sclerites symmetrical.

PREVIOUS WORK

The first report of peripsocids from the Oriental Region was by Hagen (1859), who described from Ceylon 2 new species *Ectopsocus piger* and *E. aethiops*, placing them in *Psocus*, and later transferring them to *Peripsocus* (Hagen 1866). Enderlein (1915), working on Selys-Longchamps' collection, transferred *E. piger* to *Ectopsocus*. From mainland India, Enderlein (1903b) described *E. denudatus* and *E. myrmecophilus*. The latter was placed in *Micropsocus*, a genus created by Enderlein in 1901, and later synonymized with *Ectopsocus* (Enderlein 1906a). No further peripsocids from India were recorded until 1966 when Thornton & Wong described *Peripsocus sclerotus* and reported the occurrence of 2 further species in West Bengal. The first peripsocid recorded from mainland China was *Peripsocus hedinianus* Enderlein, 1936. Thornton (1959, 1962) studied peripsocids from Hong Kong and reported the occurrence of 16 forms, 9 of which were newly described—*Peripsocus spinosus, P. fasciatus, P. pseudoquercicola, P. pictus, P. bicornis, Ectopsocus meridionalis tridentatus, E. hirsutus, E. cinctus* and *E. ornatus*. From Taiwan Enderlein (1908) recorded 1 species; Banks (1937a) recorded another and described *Peripsocus singularis* which is a caeciliid lacking the areola postica (Mockford in litt.); Takahashi (1938) reported a third species.

From Singapore Enderlein (1903b) described *Peripsocus similis* and *P. reicherti*, and *Ectopsocus maindroni* was recorded from the Batu Caves, Malaya, by Thornton (1962). Navás (1921, 1922) described *Peripsocus fulvescens* and *P. nanus* from Vietnam. From Java Enderlein (1907c) recorded 1 species and described *Peripsocus oculatus* (1926); Navás (1924) described *Ectopsocus tinctus* and *E. heurni*; and Soehardjan & Hamann (1959) described *Peripsocus variatus* and provided a new record of a known species. The paper on the Psocoptera of the Indonesian archipelago by Soehardjan (1958) summarized known distribution records. Enderlein (1901) described *Ectopsocus waterstradti* from Borneo (placing it in *Micropsocus*), and Karny (1925) added 1 known species to the Borneo records.

Of the series of papers on Psocoptera from the Philippines by Banks, only 3 contain records of Peripsocidae— *Ectopsocus aethiops* var. *bakeri* was described in 1931 and *E. basalis* (as *Micropsocus*) in 1937 (the latter was reported again in 1938).

The only record of New Guinea psocids is by Enderlein (1903) who described *Peripsocus suffitus* and *Ectopsocus erosus* (as *Micropsocus*) and recorded the occurrence of *E. waterstradti*. Enderlein (1904) recorded 2 species of *Ectopsocus* from the Bismarck Archipelago.

From the islands and atolls of Micronesia, only 3 species have been recorded from Guam (Banks 1942). A single species was reported from Fiji by Karny (1926).

Four species of *Ectopsocus* have been recorded from the Hawaiian Islands (Enderlein 1913, 1920, Banks 1931b, Zimmerman 1948), but no species of *Peripsocus* are recorded as occurring there. Species newly described from Hawaii are *Ectopsocus fullawayi* End. 1913, *E. hawaiiensis* End. 1913, and *E. perkinsi* Banks 1931.

Tillyard (1923) described *E. congener* from New Zealand, and erected a new genus, *Peripsocopsis*, for *Peripsocus maoricus, Peripsocus morulops* and *Peripsocus milleri*. This genus was synonymized by Roesler (1944) with *Peripsocus*.

The first Japanese record of Psocoptera was by Enderlein (1906b), when he described *Peripsocus quercicola*; he later (1907b) described 2 further species: *Peripsocus pumilis* and *Ectopsocopsis cryptomeriae* (placed in *Ectopsocus*) and provided 1 new record. Okamoto (1910) described *Peripsocus ignis* and *Ectopsocus flaviceps*, and provided distribution records of 4 known species.

Peripsocids are of fairly frequent occurrence in the aerial plankton; Thornton (1964) and Thornton & Harrell (1965) have reported 4 species among the insects trapped by plane and ship in the Pacific Ocean.

MATERIAL AND METHODS

The specimens used in this study were collected locally, or loaned by museums or colleagues. Freshly killed or preserved material was dissected in 70% alcohol; dry specimens were first restored by immersing in a dilute solution of detergent before transferring to 70% alcohol. The antenna, fore wing, hind wing and hind leg on 1 side (usually the left) were removed, dehydrated in absolute alcohol, cleared in Euparal Essence, and mounted on a drop of Euparal on a glass slide. The maxillary pick of psocids wears considerably during the life of the insect (Thornton 1955); this structure was thus ignored in this study.

External genitalia were processed for study as follows: the apical 1/2 of the abdomen of the insect was cut off and transferred to 10% KOH to destroy all soft tissues; the cleared apex of the abdomen was then washed in 5% acetic acid to neutralize.

Although Badonnel (1943b) studied unstained dissected specimens mounted in glycerin, in this work it was found that with small soft specimens staining has a definite advantage and is sometimes essential. Specimens were stained in either Acid Fuchsin, Fast Green, or Lignin Pink. Staining with 1% Acid Fuchsin in 1% acetic acid was carried out overnight, but adequate staining was possible with 1% Fast Green in 1% acetic acid in only 1 hour.

Preparations stained in Acid Fuchsin turn dull in a few days and may completely fade in 2 to 3 months; the advantage of this stain is that the setae stand out sharply against a lighter background. Fast Green is stable, but the setae are stained the same shade as the background and do not stand out. Both these stains were later abandoned in favor of a saturated aqueous solution of Lignin Pink (Approx. 20%).

Lignin Pink stains the chitin a brilliant pink, and although the setae do not stand out so sharply as with Acid Fuchsin, the stain is much more stable. It is more satisfactory than Fast Green because there is more differentiation between setae and background. Lignin Pink has the added advantage that overstaining does not occur and the preparation can be left in the staining solution for 2 to 3 days without ill effect; also, destaining in the dehydrating agent is very slight.

Acid Fuchsin or Fast Green stained preparations were dehydrated through 70% and absolute alcohol. Preparations stained in Lignin Pink were passed through 50% and pure Cellosolve (Ethylene Glycol Monoethyl Ether) instead of the usual alcohol series, which throws the stain out in crystals. After dehydration the preparation was cleared in Euparal Essence before being transferred to a drop of Euparal on a microscope slide for dissection.

With a female, the subgenital plate was first removed by cutting at its corners; the gonapophyses were then removed by cutting tergite 8, the left and right sides of the gonapophyses were separated from each other and from the chitinized plate at the opening of the spermatheca (if present) by cutting at appropriate points. The rectum with its contents was then removed and also the tissue between the epiproct and paraprocts. The dissected pieces were mounted in a drop of Euparal on a clean slide, manipulated so that the external surfaces faced upwards, and the epiproct and paraprocts spread. With a male, the hypandrium was first separated by cutting at the corners, then the penis frame freed. Epiproct and paraprocts were treated as in the female. The ventral surface of the penis frame was mounted uppermost. Permanent preparations of external genitalia were studied under magnifications of 100× to 400×.

Drawings from permanent preparations were made with the aid of an arc-lamp projector or camera lucida. Body parts were measured under a microscope using a micrometer eye piece standardized against a stage micrometer. Measurements of body, fore and hind wing lengths are accurate to 0.02 mm, of other body characters to 0.005 mm. For the ratio of interocular distance to diameter of eye the method used was that of Pearman (1934, see Ball 1943), and ratios are correct to 0.01.

Nomenclature follows that of Badonnel (1951), except that "clypeus" is preferred to "postclypeus", "*rs*" to "*rr*", and "outer valve" to "valvae externae".

CHECK-LIST OF PERIPSOCID SPECIES IN THE ORIENTAL REGION AND PACIFIC ISLANDS

Oriental Region

Indo-Chinese Subregion

Peripsocus quercicola Enderlein (India, Hong Kong, Macao, [4]Taiwan, also Malaya, [4]Japan)
P. sclerotus Thornton & Wong (India)
Ectopsocus cinctus Thornton (India, Hong Kong, also Malaya, Vietnam)
[4]*E. denudatus* Enderlein (India)
E. maindroni Badonnel (India, Hong Kong, also Malaya, Palawan, Micronesia, Hawaii, Galapagos, Japan, in air, [4]widespread)
E. pumilis Banks (India, Hong Kong, also Micronesia, [4]Congo, [4]N. America)
E. pilosus Badonnel (India, also Cambodia; [4]Madagascar)
[4]*E. aethiops* (Hagen) (Ceylon)
[4]*E. myrmecophilus* (Enderlein) (Ceylon, also Bismarck Archipelago, Fiji)
[4]*E. piger* (Hagen) (Ceylon)
E. decoratus n. sp. (Nepal)
[4]*Peripsocus hedinianus* Enderlein (China [Kansu])
P. bicornis Thornton (Hong Kong)
P. fasciatus Thornton (Hong Kong, also Malaya)
P. pauliani Badonnel (Hong Kong, also Malaya, Luzon, Micronesia, [4]Ivory Coast)
P. pictus Thornton (Hong Kong)
P. pseudoquercicola Thornton (Hong Kong)
P. similis Enderlein (Hong Kong, also [4]Singapore, Hawaii)
P. spinosus Thornton (Hong Kong)
P. variatus Soehardjan & Hamann (Hong Kong, also [4]Java)
P. hongkongensis n. sp. (Hong Kong)
Ectopsocopsis cryptomeriae (Enderlein) (Hong Kong, [4]Taiwan, also Japan, Micronesia, Hawaii, N. America)
Ectopsocus hirsutus Thornton (Hong Kong)
E. meridionalis Ribaga (Hong Kong, [4]Taiwan, also [4]widespread)
E. ornatus Thornton (Hong Kong, Taiwan, also [4]N. America)
E. richardsi (Pearman) (Hong Kong, also Hawaii, Galapagos, [4]widespread)
E. comitis n. sp. (Hong Kong)
[4]*Peripsocus singularis* Banks (Taiwan)
P. stenopterus n. sp. (Taiwan)

Malayan Subregion

Peripsocus fasciatus Thornton (Malaya, also Hong Kong)
P. pauliani Badonnel (Malaya, also Hong Kong, Luzon, Micronesia, [4]Ivory Coast)
P. quercicola Enderlein (Malaya, also Hong Kong, [4]Taiwan, Japan)
P. reicherti Enderlein (Malaya, [4]Singapore, [4]Java, also Seychelles)
P. anoplus n. sp. (Malaya)
P. circinus n. sp. (Malaya)

[4]Previous record.

P. constrictus n. sp. (Malaya)
P. hiatus n. sp. (Malaya)
P. selene n. sp. (Malaya, Palawan)
P. stigmatus n. sp. (Malaya)
P. valvulus n. sp. (Malaya)
Ectopsocopsis cognatus n. sp. (Malaya)
Ectopsocus cinctus Thornton (Malaya, Vietnam, also India, Hong Kong)
E. maindroni Badonnel (Malaya, [also in cave], Palawan, also [4]widespread)
E. amphithrix n. sp. (Malaya)
E. baliosus n. sp. (Malaya)
E. cirratus n. sp. (Malaya)
E. crinitus n. sp. (Malaya)
E. furcatus n. sp. (Malaya, also Fiji)
E. innotatus n. sp. (Malaya)
E. salpinx n. sp. (Malaya, Palawan, also Luzon, Micronesia)
E. tenellus n. sp. (Malaya)
E. triangulus n. sp. (Malaya, also New Guinea)
E. vannus n. sp. (Malaya)
Peripsocus similis Enderlein ([4]Singapore, also Hong Kong, Hawaii)
Ectopsocus pilosus Badonnel (Cambodia, also India, [4]Madagascar)
[4]*Peripsocus fulvescens* Navás (Vietnam)
[4]*P. nanus* Navás (Vietnam)
Ectopsocus denotatus n. sp. (Vietnam)
[4]*Peripsocus oculatus* Enderlein (Java)
P. variatus Soehardjan & Hamann ([4]Java, also Hong Kong)
[4]*Ectopsocus heurni* (Navás) (Java)
[4]*E. tinctus* Navás (Java)
E. waterstradti (Enderlein) (Java, Borneo, also New Guinea, Bismarck Arch., Guam)
[4]*Peripsocus ignis* Okamoto (Sarawak, also Japan)
P. brachyura n. sp. (Palawan)
Ectopsocus titschacki Jentsch (Palawan)
E. amblyura n. sp. (Palawan)
E. argus n. sp. (Palawan)

Philippine Subregion

Peripsocus pauliani Badonnel (Luzon, also Hong Kong, Malaya, Micronesia, [2]Ivory Coast)
[4]*Ectopsocus aethiops* var. *bakeri* Banks (Luzon)
E. basalis (Banks) (Luzon, [4]Mindanao)
E. denervus n. sp. (Luzon, also Micronesia, Samoa)
E. fumidus n. sp. (Luzon)
E. intersitus n. sp. (Luzon)
E. salpinx n. sp. (Luzon, also Malaya, Palawan, Micronesia)
E. speciosus n. sp. (Luzon, also New Guinea)
E. stictus n. sp. (Luzon)

Papuan Subregion

[4]*Peripsocus suffitus* Enderlein (New Guinea, also Guam)
P. crenulatus n. sp. (New Guinea)

P. denticulatus n. sp. (New Guinea)
Ectopsocus erosus (Enderlein) (New Guinea)
[4]*E. myrmecophilus* (Enderlein) (Bismarck Archipelago, also Ceylon, Fiji)
E. waterstradti (Enderlein) (New Guinea, Bismarck Archipelago, also Java, Borneo, Guam)
E. adelphos n. sp. (New Guinea)
E. cristatus n. sp. (New Guinea)
E. dicroglossus n. sp. (New Guinea)
E. nidicolus n. sp. (New Guinea)
E. speciosus n. sp. (New Guinea, also Luzon, Micronesia)
E. triangulus n. sp. (New Guinea, also Malaya)

Polynesan Subregion

Micronesia

Peripsocus pauliani Badonnel (Bonins, Volcanos, Marianas, Carolines, Marshalls, also Hong Kong, Malaya, Luzon, [4]Ivory Coast)
[4]*P. suffitus* Enderlein (Guam, also New Guinea)
P. ferrugineus n. sp. (Marianas, Carolines, also Fiji, Samoa, Hawaii)
Ectopsocopsis cryptomeriae (Enderlein) (Marianas, also Hong Kong, [4]Taiwan, Hawaii, Japan, [4]N. America)
Ectopsocus briggsi MacLachlan (Marianas, also [4]widespread)
E. fullawayi Enderlein (Wake, also Fiji, Samoa, Hawaii, Tubuai, Rapa, [4]Tuamotu Archipelago)
[4]*E. hawaiiensis* Enderlein (Guam, also Samoa, Hawaii)
E. maindroni Badonnel (Marianas, Carolines, Marshalls, Gilberts, also [4]widespread)
E. pumilis (Banks) (Marianas, also India, Hong Kong, [4]Congo, [4]N. America)
[4]*E. waterstradti* (Enderlein) (Guam, also Java, Borneo, New Guinea, Bismarck Archipelago)
E. boharti n. sp. (Bonins)
E. denervus n. sp. (Marianas, Carolines, Gilberts, also Philippines, Samoa)
E. fenestratus n. sp. (Marianas)
E. marginatus n. sp. (Marianas)
E. ornatoides n. sp. (Bonins, Volcanos, Marianas, Marshalls, also Fiji, Samoa, Hawaii)
E. paraplesius n. sp. (Carolines)
E. salpinx n. sp. (Marianas, also Malaya, Palawan, Luzon)
E. separatus n. sp. (Carolines)
E. speciosus n. sp. (Carolines, also Luzon, New Guinea)
E. spilotus n. sp. (Marshalls, Gilberts, also Fiji, Samoa, Hawaii)
E. thysanus n. sp. (Marianas)
E. villosus n. sp. (Carolines, Marshalls)

Eastern Melanesia

Peripsocus ferrugineus n. sp. (Fiji, also Micronesia, Samoa, Hawaii)
Ectopsocus fullawayi Enderlein (Fiji, also Samoa, Tubuai, Rapa, [4]Tuamotu Archipelago, Hawaii)
[4]*E. myrmecophilus* (Enderlein) (Fiji, also Ceylon, Bismarck Archipelago)
E. perkinsi Banks (Fiji, also Samoa, Ocean, Tubuai, Hawaii)
E. furcatus n. sp. (Fiji, also Malaya)
E. ornatoides n. sp. (Fiji, also Micronesia, Samoa, Hawaii)
E. spilotus n. sp. (Fiji, also Micronesia, Samoa, Hawaii)
E. uncinatus n. sp. (Fiji)

Central Polynesia

Peripsocus ferrugineus n. sp. (Samoa, also Micronesia, Fiji, Hawaii)

Ectopsocus fullawayi Enderlein (Samoa, also Fiji, Hawaii, Tubuai, Rapa, [4]Tuamotu Archipelago)

[4]*E. hawaiiensis* Enderlein (Samoa, also Guam, Hawaii)

E. perkinsi Banks (Samoa, also Fiji, Hawaii, Ocean, Tubuai)

E. comptus n. sp. (Samoa)

E. denervus n. sp. (Samoa, also Luzon, Micronesia, Hawaii)

E. gradatus n. sp. (Samoa)

E. ignotus n. sp. (Samoa)

E. ornatoides n. sp. (Samoa, also Micronesia, Fiji, Hawaii)

E. spilotus n. sp. (Samoa, also Micronesia, Fiji, Hawaii)

E. zimmermani n. sp. (Samoa)

E. dialeptus n. sp. (Kermadec)

Southeastern Polynesia

Ectopsocus fullawayi Enderlein (Tubuai, Rapa, [4]Pitcairn, [4]Oeno, [4]Henderson, [4]Mangareva, also Wake, Fiji, Samoa, Hawaii)

[4]*E. perkinsi* Banks (Tubuai, also Ocean, Fiji, Samoa, Hawaii)

Hawaii

Peripsocus similis Enderlein (Kauai, Oahu, Molokai, Maui, Hawaii, also Hong Kong, [4]Malaya)

P. ferrugineus n. sp. (Kauai, Oahu, Molokai, Lanai, Maui, Hawaii, also Micronesia, Fiji, Samoa)

P. nitens n. sp. (Oahu, Molokai, Maui, Hawaii, also New Zealand)

Ectopsocopsis cryptomeriae (Enderlein) Hawaii, also Hong Kong, [4]Taiwan, Micronesia, Japan, [2]N. America)

Ectopsocus fullawayi Enderlein ([4]Laysan, Kauai, Oahu, Molokai, Lanai, Maui, Hawaii, also Fiji, Samoa, Tubuai, Rapa, [4]Tuamotu Archipelago, Wake)

[4]*E. hawaiiensis* Enderlein (Hawaii, also Guam, Samoa)

E. maindroni Badonnel (Kauai, Oahu, also [4]widespread)

E. meridionalis Ribaga (Molokai, Hawaii, also [4]widespread)

E. perkinsi Banks (Ocean, Midway, Nihoa, [4]Oahu, Hawaii, also [4]Fiji, Tubuai, Samoa)

E. richardsi (Pearman) ([4]Oahu, Maui, Hawaii, also [4]widespread)

E. ornatoides n. sp. (Oahu, also Micronesia, Fiji, Samoa)

E. spilotus n. sp. (Hawaii, also Micronesia, Fiji, Samoa)

Neotropical Region

Peripsocus pauliani Badonnel (Galapagos, also Hong Kong, Malaya, Luzon, Micronesia, [4]Ivory Coast)

Ectopsocus maindroni Badonnel (Galapagos, also [4]widespread)

E. richardsi (Pearman) (Galapagos, also [4]widespread)

Australian Region

New Zealand

[4]*Peripsocus maoricus* (Tillyard) (New Zealand)

[4]*P. milleri* (Tillyard) (New Zealand)

[4]*P. morulops* (Tillyard) (New Zealand)

P. nitens n. sp. (New Zealand, also Hawaii)

Ectopsocus briggsi MacLachlan (New Zealand, also [4]widespread)

[4]*E. congener* Tillyard (New Zealand)

E. gracilis n. sp. (New Zealand)
E. punctatus n. sp. (New Zealand)

Palearctic Region

Japan

Peripsocus didymus Roesler (Japan, also [4]Europe)
[4]*P. ignis* Okamoto (Japan, also Sarawak)
[4]*P. pumilus* Enderlein (Japan)
P. quercicola Enderlein (Japan)
Ectopsocopsis cryptomeriae (Enderlein) (Japan, also Hong Kong, [4]Taiwan, Micronesia, Hawaii, [4]N. America)
[4]*Ectopsocus flaviceps* (Okamoto) (Japan)
E. maindroni Badonnel (Japan, also [4]widespread)
E. meridionalis Ribaga ([4]Japan, also [4]widespread)

ORIENTAL REGION

Indo-chinese Subregion

Peripsocus quercicola Enderlein

Peripsocus quercicola Enderlein, 1906b, Stett. Ent. Ztg. **67:** 316, ♂; 1907b, Stett. Ent. Ztg. **68:** 98 (distribution, description, ♀).— Okamoto, 1910, Ann. Hist. Nat. Mus. Hung. **8:** 188 (redescription; distribution).— Banks, 1937a, Philip. J. Sci. **62**(3): 267 (distribution).— Thornton, 1959, Proc. R. Ent. Soc. Lond. (B) **28:** 40, fig. 2, 4, 7 (redescription ♀, distribution); 1962, Trans. R. Ent. Soc. Lond. **114:** 287 (further description ♀, distribution) fig. 3, 8, 10.— Thornton & Wong 1966, Trans. R. Ent. Soc. Lond. **118:** 18 (distribution).

Distribution: India, Hong Kong, Macao, Taiwan, Malaya, Japan.

Material Examined: INDIA: 1 ♀, 1 ♂, Darjeeling Obs. Hill, 22.III.1965, I. W. B. Thornton.

HONG KONG: collected by S. K. Wong. *HONG KONG I.:* 1 ♀, 2 ♂♂, Sir Cecil's Ride, from *Pinus massoniana*, 19.I.1962; 2 ♀♀, 1 ♂, near Pokfulam Reservoir, from *P. massoniana*, 13.III.1962; 1 ♂, same data, 23.III.1962; 8 ♂♂, Mount Davis Rd., from *P. massoniana*, 2.IV.1962; 3 ♀♀, 4 ♂♂, Stubbs Rd., Peak, 400 m, from *Casuarina equisetifolia*, 2.V.1962; 12 ♀♀, 4 ♂♂, H. K. U. compound, 2.V.1962; 2 ♀♀, 2 ♂♂, near Pokfulam Reservoir, from *P. massoniana*, 3.V.1962; 9 ♀♀, 6 ♂♂, Lugard Rd., Peak, 400 m, 9.V.1962; 3 ♀♀, 1 ♂, Mount Davis Rd., 14.V.1962; 18 ♀♀, 3 ♂♂, Pokfulam Reservoir Rd., Peak, 400 m, 24.V.1962; 5 ♀♀, 1 ♂, same data, 6.VIII.1962; 45 ♀♀, 21 ♂♂, Shouson Hill, 31.V.1962; 10 ♀♀, 6 ♂♂, near Pokfulam Reservoir, 27.VI.1962; 5 ♀♀, 5 ♂♂, 2 nymphs, Lugard Rd., Peak, 400 m, 22.VIII.1962; 3 ♀♀, Mount Davis Rd., from *P. massoniana*, 15.VII.1963; 7 ♀♀, 4 ♂♂, 1 nymph, Lugard Rd., Peak, 400 m, from *Fortunella hindsii* and *Celtis sinensis*, 26.VIII.1963; 6 ♀♀, 3 ♂♂, same data but from *Acronychia pedunculata*, 20.XII.1963; 7 ♀♀, 4 ♂♂, same data but from *Ficus* sp., *Litsea glutinosa*, and *Fortunella hindsii*, 20.III.1964; 13 ♀♀, 3 ♂♂, same data but 25.III.1964; 3 ♀♀, 4 ♂♂, Pokfulam Rd., from *Celtis sinensis*, 22.IV.1964; 4 ♀♀, 6 ♂♂, near Pokfulam Reservoir, from *Pinus massoniana*, 24.IV.1964; 13 ♀♀, 3 ♂♂, Victoria Rd., Mt. Davis, from *L. glutinosa* and *Ficus retusa* trunk, 27.IV.1964; 36 ♀♀, 23 ♂♂, 22 nymphs, Pokfulam Reservoir Rd., Peak, 400 m, from *L. glutinosa*, 7.V.1964; 4 ♀♀, 1 ♂♂, same data but on dead leaves, 26.VI.1964; 3 ♀♀, same data but 11.XII.1964; 1 ♀, 1 ♂, H. K. U. compound, from dead leaves, 11.XII.1964. *NEW TERRITORIES*: 4 ♀♀, 4 ♂♂, 1 nymph, Ngong Ping, Lan Tau, 16–18.XII.1964.

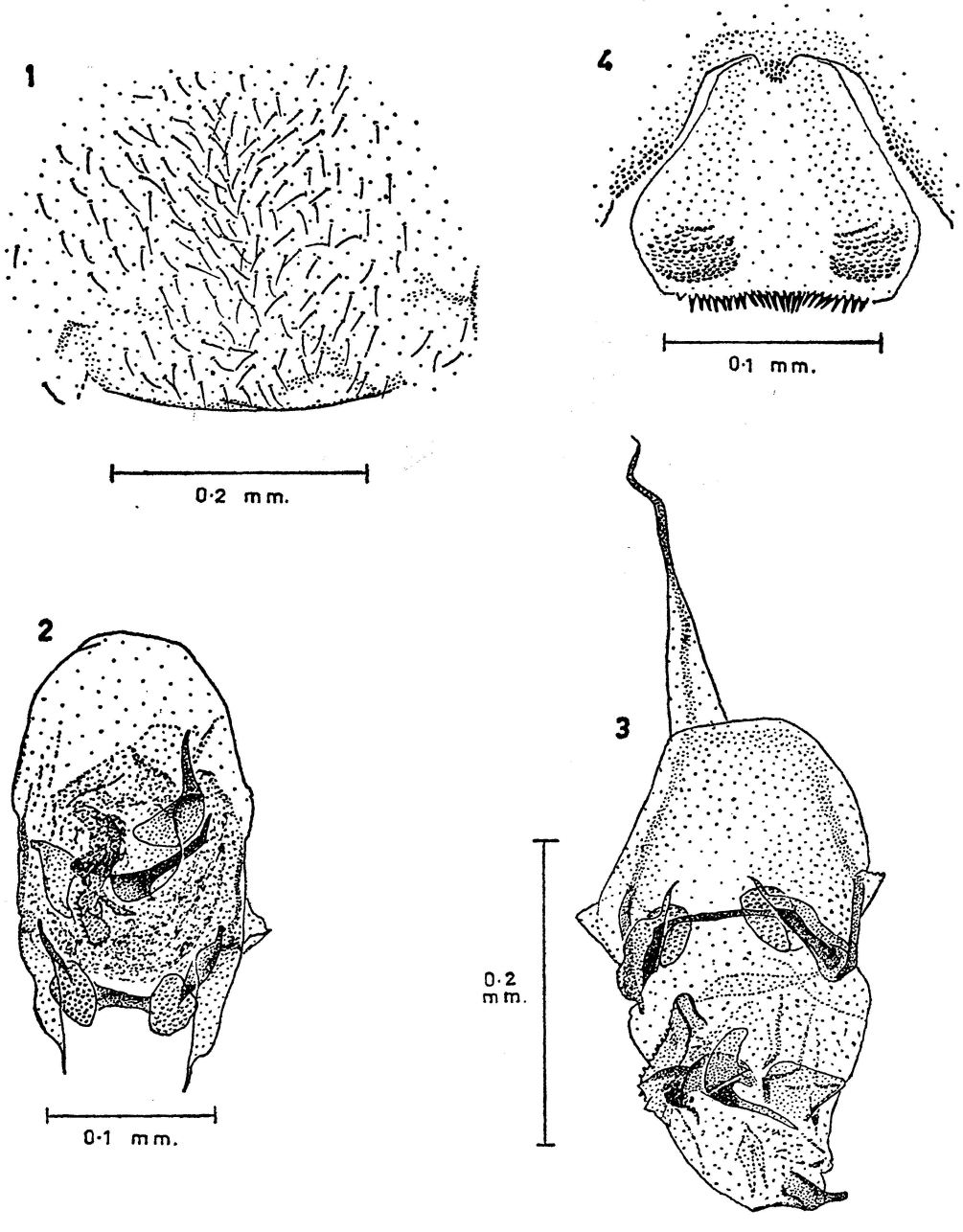


Fig. 1-4. *Ectopsocus pumilis* ♂: 1, hypandrium; 2, penis frame; 3, penis frame with aedeagal sclerites on eversion; 4, apical abdominal tergites.

MACAO: 1 ♀, Colina da Guia, 2.IV.1965; 1 ♀, Colina da Guia, from *Albizzia lebbek*, 7.VII.1965.

MALAYA: 2 ♀♀, Mt. Brinchang, Pahang, 1750 m, 17.III.1963; 3 ♀♀, 1 ♂, near Simpang Pulai, Ipoh, 29.VII.1963, S. S. Lee.

Peripsocus sclerotus Thornton & Wong

Peripsocus sclerotus Thornton & Wong, 1966, Trans. R. Ent. Soc. Lond. **118:** 16, ♀, fig. 42–45.

DISTRIBUTION: India

Ectopsocus cinctus Thornton

Ectopsocus cinctus Thornton, 1962, Trans. R. Ent. Soc. Lond. **114:** 305, ♀, fig. 40–42.—Thornton & Harrell, 1965, Pacif. Ins. **7:** 701 (distribution).— Thornton & Wong, 1966, Trans. R. Ent. Soc. Lond. **118:** 18 (♂, distribution).

DISTRIBUTION: India, Hong Kong, Malaya, Vietnam.

MATERIAL EXAMINED: INDIA: 1 ♀, 1 ♂, Calcutta Bot. Gardens, 28.V.1965, Thornton,

HONG KONG: collected by Wong. *HONG KONG I.*: 1 ♂, from *Celtis sinensis*, Pokfulam Rd., 1.VI.1962; 1 ♂, University Hall, 1.VIII.1962; 3 ♀♀, 7 ♂♂, from culture, 25.X.1964; 2 ♀♀, 3 ♂♂, from dead leaves, H. K. U. compound, 11.XII.1964; 3 ♀♀, 1 ♂, from culture, 18.II.1965. *NEW TERRITORIES:* 1 ♀, Castle Peak, 15.VIII.1963; 2 ♀♀, Fung Yuen, Tai Po, 4.IX.1964.

MALAYA: collected by Lee. 5 ♀♀, 3 ♂♂, Kuala Lumpur, on dead vegetation, 17.VII. 1963; 18 ♀♀, 10 ♂♂, near Simpang Pulai, Ipoh, on dead vegetation, 29.VII.1963.

VIETNAM: 1 ♀, Pleiku, 50 km SW, 250 m, 14.V.1961, L. W. Quate.

Ectopsocus denudatus Enderlein

Ectopsocus denudatus Enderlein, 1903b, Ann. Hist. Nat. Mus. Hung. **1:** 295, fig. 75.

DISTRIBUTION: India

Ectopsocus maindroni Badonnel

Ectopsocus maindroni Badonnel, 1935, Rev. Fr. Ent. **2:** 81 (♀), fig. 12–15.— Ball, 1943, Bull. Mus. Roy. Hist. Nat. Belg. **19:** 6 (distribution, synonymy).— Badonnel, 1946b, Rev. Zool. Bot. Afr. **39:** 180 (distribution, ♂), fig. 93, 94; 1948, *Ibid.* **40:** 316 (distribution); 1949, Rev. Fr. Ent. **16:** 43 (distribution); 1955, Publ. Cult. Cia. Diamant. Angola **26:** 185 (distribution).— Thornton, 1962, Pacif. Ins. **4:** 453 (distribution); 1962, Trans. R. Ent. Soc. Lond. **114:** 299 (distribution), fig. 26–29; 1964, Pacif. Ins. **6:** 286 (distribution).— Mockford, 1965, Florida Ent. **48**(2): 112 (distribution).

Ectopsocus cryptomeriae Jentsch, 1939, Zool. Jahrb. **73:** 111 (nec *Ectopsocus cryptomeriae* End.), (synonymy, internal genital system), fig. 4, 15–18.

DISTRIBUTION: India, Hong Kong, Malaya (also in cave), Palawan, Micronesia, Hawaiian Islands, Galapagos, (also widespread).

MATERIAL EXAMINED: INDIA: 1 ♀, Trichur, 4 m, Kerala, on mango leaves, 23.III.1965, A. H. Nadakavukaren.

HONG KONG: collected by Wong unless otherwise stated. *HONG KONG I.:* 3 ♀♀, 5 ♂♂, in cupboard in private house, IX.1961, M. N. Adal; 6 ♀♀, 7 ♂♂, 3 nymphs, above water line in aquarium, H. K. U., IX.1961; 5 ♀♀, 1 ♂, Mt. Davis Rd., 14.V.1962; 1 ♀, on desk in private house, 6.X.1962; 1 ♂, in bathroom in private house, 21.XI.1962; 5 ♀♀, 5 ♂♂, on wooden board, H. K. U., 29.IX.1963; 41 ♀♀, 47 ♂♂, from culture, 24.IV.1964; 26 ♀♀, 25 ♂♂, 16 nymphs, from culture, 9.VI.1964; 16 ♀♀, 11 ♂♂, from culture, 20.VII.1964; 9 ♀♀, 7 ♂♂, from culture, 25.X.1964; 9 ♀♀, 4 ♂♂, from culture, 12.II.1965. *NEW TERRITORIES:* 1 ♂, Tai Po, 4.IX.1964.

PALAWAN: 2 ♀♀, 1 ♂, Aborlan, coconut thatch, 17.IV.1965, Thornton.

PHILIPPINES: 1 ♂, on *Oryza sativa*, 15.V.1961, H. W.; 1 ♀, 1 ♂, with pepper, garlic,

intercepted Seattle-Washington, 10.IX.1961.

MICRONESIA: *N. MARIANAS: ANATAHAN*: 2 ♀♀, 26.VIII.1951, R. M. Bohart. *S. MARIANAS: SAIPAN*: collected by H. S. Dybas unless otherwise stated: 1 ♀, As Mahetog area, 1–5.I.1945; 1 ♂, I.1945; 2 ♀♀, I.1945; 2 ♀♀, 2 ♂♂, near Garapan, 19.I.1945; 11 ♀♀, 4 ♂♂, Mt. Tagpochau, 1 m, NNE of summit, on dry birds' skeleton, 27.I.1945; 1 ♂, As Mahetog area, beating vegetation, 15.III.1945; 18 ♀♀, 3 ♂♂, 7.V.1945; 1 ♀, 3 ♂♂, As Mahetog area, 26.IX.1945; 1 insect, sex unknown, VI.1951, Bohart. *TINIAN:* 1 ♀, NW slope of Mt. Lasso, beating vegetation, 25.III.1945; 2 ♀♀, NW slope of Mt. Lasso, 1.IV.1945; 1 ♀, 1–14.IV.1945; 1 ♀, beach cove S of Gurgon Point, 5.IV.1945; all collected by Dybas. *CAROLINES: PALAU:* 1 ♀, Koror, in pan of formalin-preserved fish, 29.IV.1957, C. F. Clagg. *KUSAIE:* 1 ♂, Tafunsak, 1 m, ex fruit of Ku 75, 10.III.1953, J. F. G. Clarke. *MARSHALLS: UJAE:* 1 ♀, Bock I., flying, F. R. Fosberg. *KWAJALEIN:* 6♀♀, 7♂♂, Chuge I., from moldy books, 29.VIII.1944, H. S. Wallace; 1 ♀, 1 ♂, sweeping, 9.IX.1956, Clagg. *ENIWETOK:* 1 ♀, Japtan, 15.V.1946, H. K. Townes. *GILBERTS: BUTARITARI:* 7 ♀♀, 6 ♂♂, XII.1957, N. Krauss. *MARAKEI:* 2 ♀♀, 1 ♂, XII. 1957, Krauss.

GALAPAGOS: 1 ♀, Academy Bay, Isla Santa Cruz, 12.II.1964, D. Q. Cavagnaro & R.O. Schuster; 58 ♀♀, 69 ♂♂, Horneman Farm, 220 m, Isla Santa Cruz, 7.V.1964, Cavagnaro.

HAWAII: See Thornton (in press).

JAPAN: 1 ♀, 1 ♂, with herbs, seeds, dried plums, 21.VI.1961, K. Ross.

Ectopsocus pumilis (Banks)

Peripsocus pumilis Banks, 1920, Bull. Mus. Comp. Zool. **64**(3): 313, ♀ (nec *Ectopsocus pumilis* (Banks) Chapman 1930, Sommerman 1943).

Ectopsocus ghesquièrei Ball, 1943, Bull. Mus. Roy. Hist. Nat. Belg. **19:** 11, ♀, fig. 6–8.— Badonnel, 1946, Rev. Zool. Bot. Afr. **39:** 182 (distribution).— Pearman, 1960, Entomologist **93:** 249 (distribution).— Thornton, 1962, Trans. R. Ent. Soc. Lond. **114:** 298 (distribution).

Ectopsocus pumilis: Mockford, 1965, Florida Ent. **48**(2): 113 (synonymy, distribution).

A culture was maintained in the laboratory since 9.VI.1964 from 9 females taken in a private house. The insect proved to be parthenogenetic in Hong Kong, and 6 generations have been raised over a period of 8 months without the appearance of a single male. However, males occur in India and a description is provided below:

♂. *Coloration* (after 5 months in alcohol): As ♀. *Morphology:* Antenna slightly longer and thicker, and with denser setae than ♀. Hypandrium (fig. 1) simple, setose, penis frame (fig. 2, 3) inner parameres sclerotized, fused, each side with a thimble-shaped lobe beset with tubercles, 5 radula sclerites, 2 pointed, 1 pocket-like, 1 hatchet-shaped, and 1 spinous.

Tergite 8 (fig. 4) with small, semicircular median apical lobe beset with small tubercles; and 2 larger groups of tubercles more laterally. Tergite 9 (fig. 4) vase-shaped, with apical comb of 13–25 (5 specimens) small teeth; 2 subapical lateral groups of small tubercles; sclerotization as 2 subparallel lines. Metric and meristic characters as in Table 1.

DISTRIBUTION: India, Hong Kong, Micronesia, Africa (Congo), N. America.

MATERIAL EXAMINED: Allotype ♂ (tube I39.1, slides I39.1a, b), in black light trap, intercepted in Miami Plant Inspect. Sta., Miami, Florida, 15.VII.1965, J. C. Buff; paratypes (tube I34.1, slides I34.1a, b), Trichur, Kerala, S India, on mango leaves, 23.III.1965, Nadakavukaren; paratypes 5 ♀♀, 2 ♂♂, same collecting data as allotype, 4 ♀♀, 3 ♂♂, same collecting data as paratype ♂.

INDIA: 2 ♂♂, on orchids, intercepted in Miami, Florida, 14.IX.1964, A. Cunningham; 1 ♂, Trichur, Kerala, on dry banana leaves, 5.II.1965, Nadakavukaren; 1 ♂, same loc., on mango leaves, 26.III.1965, Nadakavukaren; 1 ♂, Chalakudi, Kerala, on dry banana leaves, 5.III.1965, Nadakavukaren; 2 ♂♂, at window, Miami Plant Inspect. Sta., Miami, Florida, 24.VI.1965, C. E.

Stegmaier; 5 ♀♀, 2 ♂♂, in black light trap, Miami Plant Inspect. Sta., 16.VII.1965, Buff; 2 ♂♂, 1 nymph, on *Cymbidium* sp., intercepted at Kennedy Airport, N. Y., 2.VIII.1965, J. Hidalgo et al.

HONG KONG: collected by Wong. *HONG KONG I.:* 1 ♀, H. K. U. compound, from dead leaves, 10.V.1962; 1 ♀, Mt. Davis Rd., 14.IV.1962; 9 ♀♀, from cupboard in private house, 9.VI.1964; 70 ♀♀, from culture, 4.VII.1964; 117 ♀♀, from culture, 25.X.1964; 173 ♀♀, 7 nymphs, from culture, 15.I.1965. *NEW TERRITORIES:* 3 ♀♀, from dead *Clausena lansium* branches, Fung Yuen, Tai Po.

MICRONESIA: *S. MARIANAS: SAIPAN:* 1 ♀, 7.V.1945, Dybas.

The male of this species has been collected from India only. One of these had apparently just copulated, had the apex of the abdomen bent dorsally, and the radula sclerites everted (fig. 3). A female collected with this specimen had the apex of the abdomen bent ventrally and the subgenital plate splayed apart from the paraprocts; evidently this was the partner of the male referred to above. Possibly this species originated in the continental Oriental Region, and as it spread to other regions acquired the parthenogenetic habit with the loss of males. Several specimens received from Mockford were collected in the plant inspection station at Miami, Florida, U. S. A., from material having an Indian origin; some of these were males.

Table 1. Metric (in mm) and meristic characters of 5 ♂♂ of *Ectopsocus Pumilis,* and of *E. pilosus* (♀, ♂). (Measurements in this and following tables are accurate to 0.02 mm for B, Fw and Hw; and to 0.005 mm for other characters.)

	E. pumilis ♂					*E. pilosus*	
						♀	♂
B (body length)	1.54	–	1.32	1.30	1.48	1.80	1.58
A (antennal length)	0.935	1.025	1.075	0.940	1.000	0.995	1.185
f_1 (basal flagellar segment length)	0.185	0.200	0.220	0.200	0.205	0.230	0.285
f_2 (2nd flagellar segment length)	0.115	0.115	0.125	0.115	0.115	0.105	0.125
Ratio f_1/f_2	1.65	1.70	1.74	1.70	1.82	2.18	2.26
Ratio I. O.: D (interocular distance to diameter of eye)	3.08	3.66	3.63	3.55	3.33	4.57	4.40
Fw (fore wing length)	1.26	1.30	1.32	1.32	1.32	1.54	1.62
Hw (hind wing length)	1.02	1.04	1.08	1.08	1.08	1.22	1.30
Hf (hind femur length)	0.280	0.285	0.305	0.295	0.300	0.385	0.390
Ht (hind tibia length)	0.470	0.485	0.510	0.505	0.490	0.605	0.635
t_1 (basal hind tarsal segment length)	0.180	0.185	0.200	0.195	0.190	0.190	0.210
t_2 (distal hind tarsal segment length)	0.080	0.075	0.080	0.075	0.080	0.085	0.085
Ratio t_1/t_2	2.25	2.57	2.50	2.69	2.41	2.24	2.46
Ct (ctenidiobothria number)	13	13	15	13	14	11	14
Tr (trichobothria number)	8	8	8	8	8	8	8

The fore wing pattern and female genitalia of this species show a similarity to *E. maindroni* Bad. (widespread), but *E. pumilis* differs in the sclerotization of the apical lobes of the subgenital plate, and the fact that they are convergent. The male genitalia, show a close similarity to those of *E. briggsi* MacLach. (widespread); however, the radula sclerites and the ornamentation on tergite 8 and 9 differ. *E. pumilis* (Banks) thus appears to be intermediate between the maindroni and briggsi groups of *Ectopsocus.*

Ectopsocus pilosus Badonnel, 1968: p.

♀. *Coloration* (after 1 yr in alcohol): Setae on head and body dark brown. Head light buff, usual pattern indistinct pale grayish brown. Clypeal striae very faint, indistinct. Maxillary palp light brown. Antenna light brown. Ocelli pale. Eyes black. Thorax light buff. Leg: coxa, trochanter, and femur pale buff, tibia and tarsal segments light brown. Fore wing (fig. 5) light brown, slightly darker along apex of m_3 and cu_1; veins brown. Hind wing light brown, veins brown. Abdomen light buff with light brown transverse bands.

Morphology: Setae on head stout, very long. Femur broad. Fore wing (fig. 5) marginal setae long, stout at wing base, finer towards wing apex, extra row from *sc* to m_1; setae on veins stout, long, fairly sparse; pterostigma granulation fine; veins *rs* and *m* fuse for a short length or united by a short cross-vein; *r* fork about 2× as long as stem. Hind wing with 14–19 (2 specimens) fairly thick, fairly long, marginal setae between r_1 to r_{4+5}. Subgenital plate (fig. 6) apical lobe median, apex deeply indented in middle, incipiently 2-lobed, 3 stout setae on either side of indentation. Sclerotization on main plate as 2 large ovoids, on lining as 2 longitudinal strongly sclerotized subparallel lines, and irregular anteriorly. Gonapophyses (fig. 7): ventral valve very broad and rounded basally, bearing a group of spine-like structures constricting to a point apically with minute apical setae; outer valve with apical field of 7 fine setae. Paraproct with a median transverse row of 4 or 5 long setae and a large spine on mesial face.

Metric and meristic characters as in Table 1.

♂. *Coloration* (after 1 yr in alcohol): As ♀.

Morphology: Antenna longer but not thicker than that of ♀. Hypandrium (fig. 8) apically as a low lobe with straight margin, lateral hook small. Penis frame (fig. 9) inner parameres fused to a broad plate with 2 lateral prongs directed posteriorly and curving mesially; 7 pointed radula sclerites of various shapes and sizes. Tergite 9 (fig. 10) trapezoid, slightly longer than broad, with narrow apical band of small tubercles and subapical group of larger tubercles; sclerotization lateral, and a curved band from subapical tubercles laterally. Metric and meristic characters as in Table 1.

DISTRIBUTION: India, Cambodia, Madagascar.

MATERIAL EXAMINED: ♀ (tube I34.9, slides I34.9a, b), Trichur, Kerala, S. India, 23.III. 1965, Nadakavukaren; allotype ♂ (tube I33.1, slides I33.1a, b), Chalakudi, Kerala, S. India, on dry banana leaves, 5.III.1965, Nadakavukaren.

CAMBODIA: 1 ♀, 3 ♂♂, Phnom Penh, on dead palm leaves, 7.IV.1966, Wong.

E. pilosus Bad. resembles *E. hirsutus* Th. (Hong Kong) in both fore and hind wing chaetotaxy and in genitalic characters; it differs, however, in the sclerotization of the subgenital plate lining, in the presence of spines on the ventral valve, in the presence of a larger number of radula sclerites in the penis frame, and in the details of the ornamentation of tergite 9.

Ectopsocus aethiops (Hagen)

Psocus aethiops Hagen, 1859, Verh. Zool. Bot. Ges. Wien, p. 204.

Peripsocus aethiops: Hagen, 1866, Verh. Zool. Bot. Ges. Wien **16:** 210 (new combination).— Enderlein, 1903b, Ann. Hist. Nat. Mus. Hung. **1:** 292.

Ectopsocus aethiops var. *bakeri* Banks 1931a, Psyche, Cam. Mass. **38:** 58 (distribution).

DISTRIBUTION: Ceylon, Philippines.

Ectopsocus myrmecophilus (Enderlein)

Micropsocus myrmecophilus Enderlein, 1903a, Ann. Hist. Nat. Mus. Hung. **1:** 298 (distribution); 1904, Zool. Jahrb. Abt. Syst. **20:** 105–12 (distribution); 1906b, Zool. Jahrb. Abt. Syst. **23:** 401–12 (new combination).— Karny, 1926, Bull. Ent. Res. **16:** 290 (distribution).

DISTRIBUTION: Ceylon, Fiji, Bismarck Archipelago.

Ectopsocus piger (Hagen)

Psocus piger Hagen, 1859, Verh. Zool. Bot. Ges. Wien p. 202.

Peripsocus piger: Hagen, 1866, Verh. Zool Bot. Ges. Wien **16:** 210 (new combination).— Enderlein, 1903b,

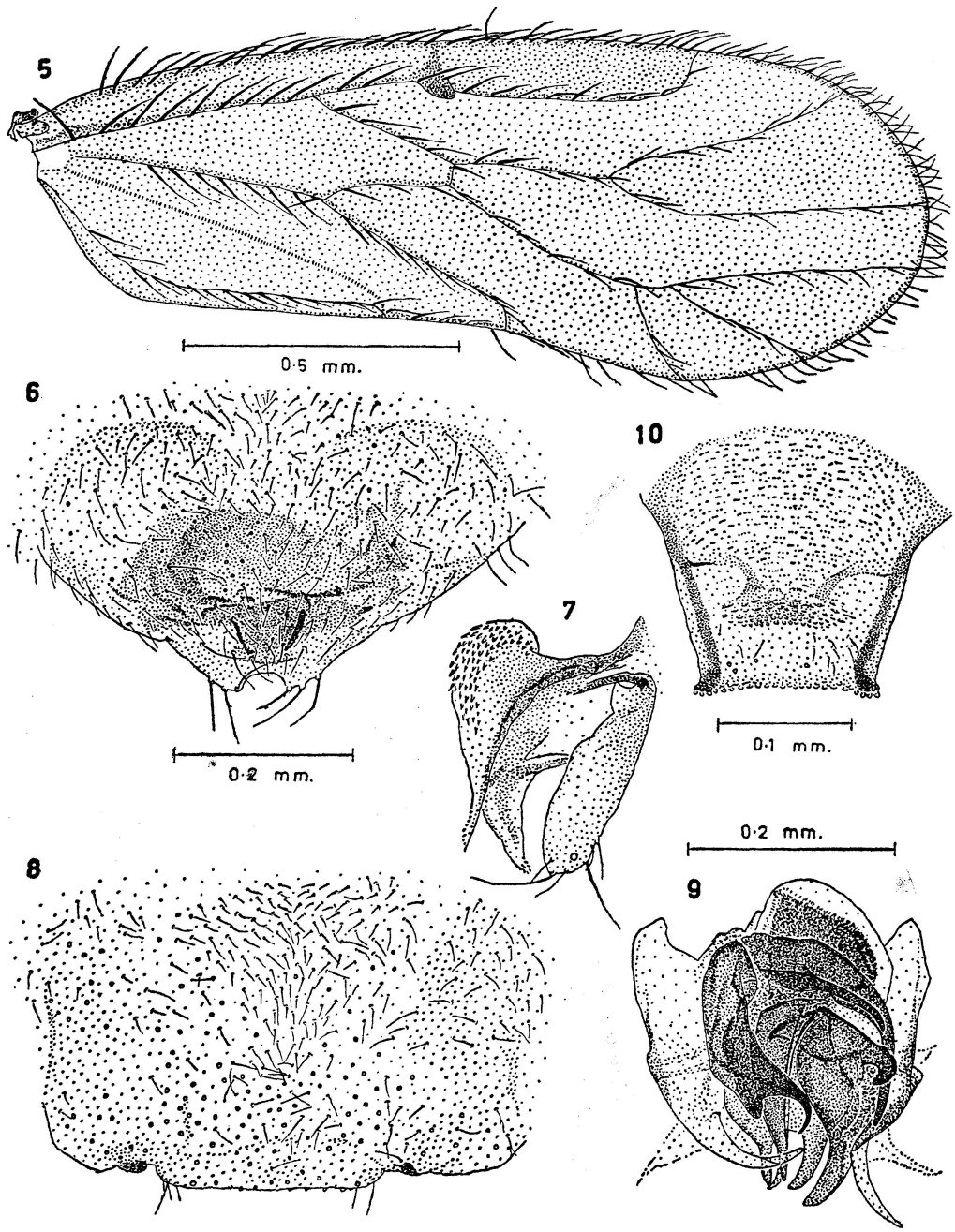


Fig. 5-10. *Ectopsocus pilosus:* 5, ♂ fore wing; 6, subgenital plate; 7, gonapophyses; 8, hypandrium; 9, penis frame; 10, ♂ apical abdominal tergite. (6, 8 and 7, 10 to common scales.)

Ann. Hist. Nat. Mus. Hung. **1:** 292 (distribution).

Ectopsocus piger: Enderlein, 1915, Collections zoologique du Baron. Edm. de Selys-Longchamps **3**(2): 44. (distribution) (new combination).

DISTRIBUTION: Ceylon.

Ectopsocus decoratus Thornton and Wong, new species

♀. *Coloration* (after 5 yr in alcohol): Head buff, markings hardly discernible. Clypeus with very narrow, indistinct light brown striae. Labrum light brown. Maxillary palp light brown. Antenna light brown. Ocelli pale, central margin bordered dark brown. Eyes black. Thoracic terga buff, suture cream, bordered cream. Thoracic pleura cream, with diffuse longitudinal light brown band. Leg: coxa very light brown, trochanter and femur cream, tibia and tarsal segments light brown. Fore wing (fig. 11) very light brown; veins light brown. Hind wing similar. Abdomen cream.

Morphology: Fore wing (fig. 11) marginal setae very fine, very short, extra row from *sc* to r_{4+5}; setae on veins short, dense; pterostigma apex smoothly rounded, finely granulated; veins *rs* and *m* fuse for a short length. Hind wing bare. Subgenital plate (fig. 12) apical lobes short, bluntly triangular, each with 3 stout and 1 fine setae, sclerotization at anterior corners. Sclerotization on main plate as 2 ovoid areas. Gonapophyses (fig. 13): ventral valve broad basally, tapering apically; outer valve with a subapical pocket-like fold and an apical field of fairly stout setae. Paraproct with a median transverse row of 5 long setae, and a small double spine with unequal members on mesial face. Metric and meristic characters as in Table 2.

♂. *Coloration* (after 5 yr in alcohol): As ♀. *Morphology:* Hypandrium (fig. 14) simple. Penis frame (fig. 15) inner parameres fused into a broad plate with 2 lateral prongs directed posteriorly; a short, rounded radular sclerite on either side of mid line. Tergite 9 (fig. 16) broad, with apical comb of 38–41 (2 specimens) short teeth; 2 lateral groups of scale-like sculpturing anteriorly. Metric and meristic characters as in Table 2.

DISTRIBUTION: Nepal

MATERIAL EXAMINED: Holotype ♀ (USNM) (tube N1.1, slides N1.1a, b), Nepal, on *Dioscorea* seeds intercepted in Washington D. C., 18.XII.1962, J. F. Shoen; allotype ♂ (tube N1.4, slides N1.4a, b), same collecting data; paratypes 2 ♀♀, 2 ♂♂, 2 nymphs, same collecting data as holotype and allotype.

In genitalic characters *E. decoratus* resembles somewhat *E. basalis* Banks (Philippines) but is

Table 2. Metric (in mm) and meristic characters of 2 ♀♀ and 2 ♂♂ of *Ectopsocus decoratus*, and of 4 ♀♀ of *Peripsocus variatus*.

	E. decoratus				*P. variatus*			
	♀		♂					
B	1.60	1.70	1.42	1.62	1.40	1.40	1.44	1.32
A	1.035	1.120	–	1.385	0.940	0.880	0.890	0.790
f_1	0.240	0.240	0.285	0.285	0.130	0.125	0.120	0.120
f_2	0.145	0.130	0.165	0.165	0.100	0.105	0.095	0.095
Ratio f_1/f_2	1.64	1.84	1.72	1.72	1.30	1.19	1.23	1.31
Ratio I. O.: D.	3.69	4.20	1.30	1.50	–	2.77	2.77	2.62
Fw	1.48	1.48	1.60	1.62	1.54	1.54	1.52	1.36
Hw	1.24	1.18	1.30	1.30	1.20	1.18	1.14	1.06
Hf	0.330	0.345	0.360	0.360	0.250	0.250	0.260	0.250
Ht	0.555	0.590	0.605	0.630	0.510	0.495	0.505	0.490
t_1	0.165	0.180	0.200	0.205	0.130	0.140	0.130	0.130
t_2	0.080	0 080	0.075	0.075	0.065	0.065	0.065	0.065
Ratio t_1/t_2	2.08	2.25	2.73	2.67	2.00	2.19	2.00	2.00
Ct	14	14	19	16	11	12	13	10
Tr	9	8	8	8	15	16	16	12

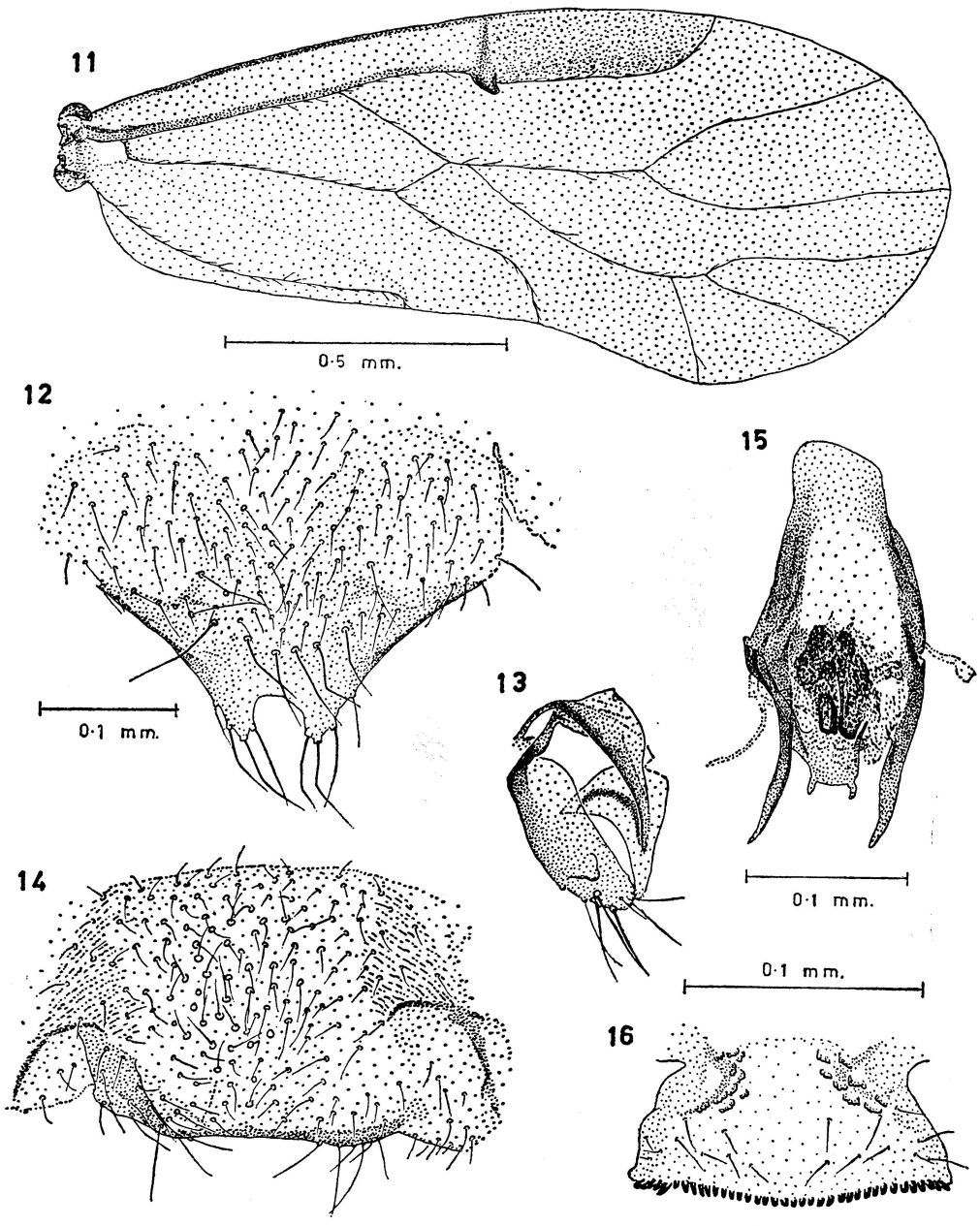


Fig. 11-16. *Ectopsocus decoratus:* 11, ♀ fore wing; 12, subgenital plate; 13, gonapophyses; 14, hypandrium; 15, penis frame; 16, ♂ apical abdominal tergite. (12, 14 and 13, 15 to common scales.)

unique in the following features: pocket-like fold on outer valve, anterior sclerotization of penis frame, and presence of scale-like sculpturing on tergite 9.

Peripsocus hedinianus Enderlein

Peripsocus hedinianus Enderlein, 1936, Arkiv. Zool. **27A** (1b): 5 fig. (distribution).

DISTRIBUTION: China (Kansu).

Peripsocus bicornis Thornton

Peripsocus bicornis Thornton, 1962, Trans. R. Ent. Soc. Lond. **114:** 292, fig. 17–20.

DISTRIBUTION: Hong Kong.

MATERIAL EXAMINED: HONG KONG: *NEW TERRITORIES:* 1 ♂, Castle Peak, 15. VIII.1963, Wong.

Peripsocus fasciatus Thornton

Peripsocus fasciatus Thornton, 1959, Proc. R. Ent. Soc. Lond. (B) **28:** 45, fig. 9, 10, 13–17; 1962, Trans. R. Ent. Soc. Lond. **114:** 287 (distribution).

♂. (further description). Penis frame (fig. 17) with 10 radula sclerites: 6 simple, 2 feather-like, and 2 with branches.

DISTRIBUTION: Hong Kong, Malaya.

MATERIAL EXAMINED: HONG KONG: collected by Wong. *HONG KONG I.:* 3 ♀♀, 3 ♂♂, 4 nymphs, Hatton Road, 200 m, 12.I.1962; 6 ♀♀, Sir Cecil's Ride, from *Pinus massoniana*, 19.I.1962; 1 ♂, near Pokfulam Reservoir, from *P. massoniana*, 12.III.1962; 1 ♀, same data, 23.III. 1962; 1 ♀, Mt. Davis Rd., from *P. massoniana*, 19.IV.1962; 21 ♀♀, 1 ♂, Stubbs Rd., Peak, 300 m, from *Casuarina equisetifolia*, 2.V.1962; 9 ♀♀, 4 ♂♂, Lugard Rd., Peak, 400 m, 2.V.1962; 28 ♀♀, 9 ♂♂, same, 9.V.1962; 13 ♀♀, 15 ♂♂, same data, from *Acronychia pedunculata*, 20.XII.1963; 24 ♀♀, 12 ♂♂, 7 nymphs, same data, from *Ficus* sp., *Litsea glutinosa* and *Fortunella hindsii*, 20.III. 1964; 38 ♀♀, 27 ♂♂, same data, 25.III.1964; 2 ♀♀, H. K. U. compound, 2.V.1962, 1 ♀, 1 ♂, near Pokfulam Reservoir, 3.V.1962; 1 ♂, Pokfulam Reservoir Rd., Peak, 400 m, 24.V.1962; 3 ♀♀, 2 ♂♂, Mt. Davis Rd., from *P. massoniana*, 31.XII.1962; 1 ♂, near Pokfulam Reservoir, from *P. massoniana*, 24.IV.1964; 35 ♀♀, 7 ♂♂, Finlay Rd., Peak, 400 m, from *Litsea chinensis*. 11.XI.1964; 3 ♀♀, same data, from *F. hindsii*, 9.XII.1964; 23 ♀♀, 18 ♂♂, Lugard Rd., Peak, 400 m, from *L. glutinosa* and *F. hindsii*, 11.II.1965; 106 ♀♀, 64 ♂♂, 22 nymphs, same data, from *Machilus pauhoi*, *F. hindsii* and *Ligustrum sinense*, 19.III.1965; 8 ♀♀, 3 ♂♂, same data, 10.IV.1965; 21 ♀♀, 10 ♂♂, 6 nymphs, same data, 6.V.1965. *NEW TERRITORIES:* 1 ♀, Sai Kung, from *P. massoniana*, 10.IV.1962.

MALAYA: 4 ♀♀, 1 ♂, near Simpang Pulai, Ipoh, 29.VII.1963, S. S. Lee.

Peripsocus pauliani Badonnel

Peripsocus pauliani Badonnel, 1949, Rev. Fr Ent. **16:** 42, fig. 56–58 (♀).

DISTRIBUTION: Hong Kong, Malaya, Philippines, Micronesia, Africa.

MATERIAL EXAMINED: HONG KONG: 86 ♀♀, 13 nymphs, near Pokfulam Reservoir, from *Pinus massoniana*, 17.X.1962, Wong.

MALAYA: 1 ♀, near Simpang Pulai, Ipoh, 29.VII.1963, Lee.

PHILIPPINES: 10 ♀♀, Tagaytay, Luzon, Taal Vista Lodge, 700 m, beating, 19.XI.1961, Thornton.

MICRONESIA: *VOLCANOS: IWO JIMA:* 10 ♀♀, sweeping, 11.V.1956, R. J. Goss. *S. MARIANAS:* collected by Dybas. *SAIPAN:* 5 ♀♀, Laulau Bay area, beating vegetation, 3.XII. 1944; 2 ♀♀, Achugan, 6.XII.1944; 3 ♀♀, near Garapan, 24.XII.1944; 4 ♀♀, Garapan. 24.XII. 1944; 1 ♀, As Mahetog area, 6.I.1945; 1 ♀, same data, 19.I.1945; 4 ♀♀, same data, 20.I.1945; 1 ♀, same data, beating vegetation, 31.I.1945; 7 ♀♀, near Garapan, 19.I.1945; 1 ♀, hills E of

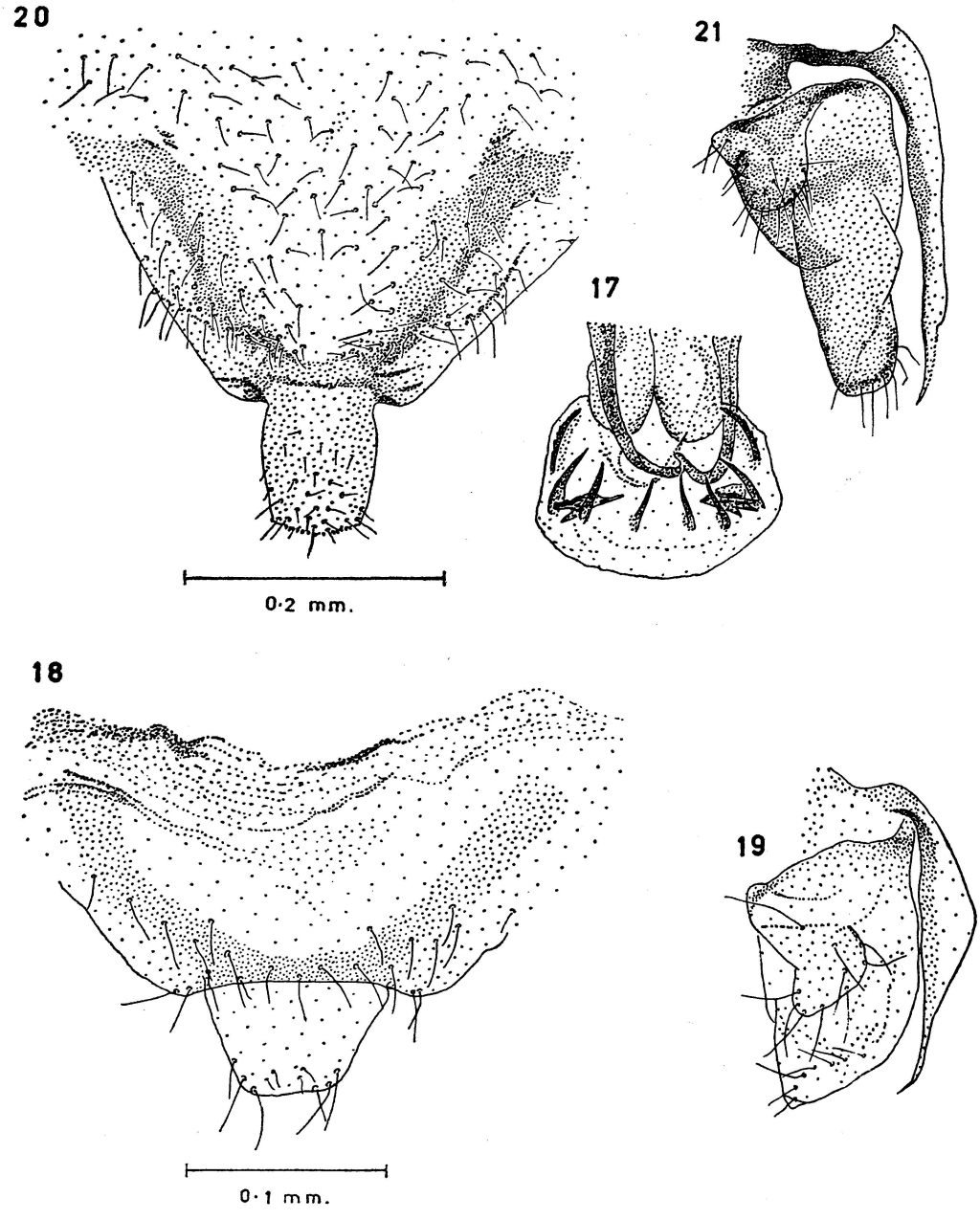


Fig. 17-21. *Peripsocus fasciatus:* 17, aedeagal sclerites on eversion. *Peripsocus variatus:* 18, subgenital plate; 19, gonapophyses. *Peripsocus reicherti:* 20, subgenital plate; 21, gonapophyses. (17, 20, 21 and 18, 19 to common scales.)

Garapan, beating vegetation, 23.I.1945; 1 ♀, Mt. Tagpouchau, 380 m, 16.II.1945; 3 ♀♀, Kalabera area, 16.II.1945; 5 ♀♀, near Garapan, 3.III.1945; 1 ♀, Obyan Point, 5.V.1945; 6 ♀♀, 7.V.1945. *TINIAN:* 4 ♀♀, ridge SE section, 27.III.1945; 1 ♀, NW slope of Mt. Lasso, 1.IV.1945; 6 ♀♀, Lake Hagoi, beating vegetation, 4.IV.1945; 1 ♀, 10–30.IV.1945. *CAROLINES: PALAU:* 1 ♀, Melekei, Babelthuap, at light, 22.V.1957, Clagg. *YAP:* 1 ♀, Colonia, 25.VI.1950, Goss; 2 ♀♀, Gagil dist. 1, S. Yap I., VII–VIII.1950. *MARSHALLS: KWAJALEIN:* 1 ♀, light trap, 8.IX. 1956, Clagg.

This species was described from a single female from Ivory Coast. The recent collection in Hong Kong of over 80 females and no males strongly suggests that the species is parthenogenetic.

Peripsocus pictus Thornton

Peripsocus pictus Thornton, 1962, Trans. R. Ent. Soc. Lond. **114:** 290, fig. 5, 6. 11–14.

DISTRIBUTION: Hong Kong

MATERIAL EXAMINED: HONG KONG: collected by Wong. *HONG KONG I.:* 48 ♀♀, 33 ♂♂, Mt. Davis Rd., from *Pinus massoniana*, 2.IV.1962; 36 ♀♀, 5 ♂♂, same data, 15.VIII. 1963; 15 ♀♀, same loc., 19.IV.1962; 1 ♂, same loc., 14.V.1962; 1 ♀, Hatton Rd., 10.X.1962; 2 ♀♀, Victoria Rd., Mt. Davis, 2.I.1963; 2 ♀♀, near Pokfulam Reservoir, from *P. massoniana*, 27.II.1964; 107 ♀♀, 20 ♂♂, Mt. Davis Rd., from *P. massoniana*, *Casuarina equisetifolia* and *Albizzia lebbek*, 14.IV.1964; 38 ♀♀, 1 ♂, near Pokfulam Reservoir, from *P. massoniana*, 24.IV.1964; 1 ♂, Finlay Rd., Peak, 400 m, from *Fortunella hindsii*, 9.VII.1964.

Peripsocus pseudoquercicola Thornton

Peripsocus pseudoquercicola Thornton, 1962, Trans. R. Ent. Soc. Lond. **114:** 288, fig. 4, 7, 9, 15.

DISTRIBUTION: Hong Kong.

MATERIAL EXAMINED: HONG KONG: collected by Wong. *HONG KONG I.:* 87 ♀♀, 33 ♂♂, Mt. Davis Rd., from *Pinus massoniana*, 2.IV.1962; 17 ♀♀, 3 ♂♂, same data, 19.IV.1962; 10 ♀♀, 8 ♂♂, Lugard Rd., Peak, 400 m, 2.V.1962; 1 ♂, same data, 9.V.1962; 1 ♀, same data, from *Acronychia pedunculata*, 20.XII.1963; 3 ♀♀, 2 ♂♂, H. K. U. compound, 2.V.1962; 1 ♂, near Pokfulam Reservoir, from *P. massoniana*, 3.V.1962; 9 ♀♀, 4 ♂♂, Mt. Davis Rd., 14.V.1962; 133 ♀♀, 17 ♂♂, same data, from *P. massoniana*, *Casuarina equisetifolia* and *Albizzia lebbek*, 14.IV.1964; 1 ♀, Shouson Hill, 14.I.1965; 5 ♀♀, 5 ♂♂, same data, 31.V.1962. *NEW TERRITORIES:* 1 ♂, Sai Kung, from *P. massoniana*, 10.IV.1962; 1 ♀, Sha Tin, 1.VIII.1963; 1 ♀, Fung Yuen, Tai Po, from dead *Litchi chinensis*, 4.IV.1964.

Peripsocus similis Enderlein

Peripsocus similis Enderlein, 1903b, Ann. Hist. Nat. Mus. Hung. **1:** 290 (nec. Badonnel, 1955) ♀, Tab. VII, fig. 44.— Smithers, 1959, Ent. Mon. Mag. **94:** 274 (synonymy).— Thornton, 1959, Proc. R. Ent. Soc. Lond. (B) **28:** 37 (redescription, distribution) fig. 1, 3, 6; 1962, Trans. R. Ent. Soc. Lond. **114:** 285 (distribution).

DISTRIBUTION: Hong Kong, Singapore, Hawaiian Islands.

MATERIAL EXAMINED: HONG KONG: collected by Wong. *HONG KONG I.:* 1 ♀, Mt. Davis Rd., from *Pinus massoniana*, 19.IV.1962; 22 ♀♀, Mt. Davis Rd., 14.V.1962; 1 ♀, same data, 14.VI.1962; 1 ♀, Lugard Rd., Peak, 400 m, 9.V.1962; 1 ♀, Shouson Hill, 31.V.1962; 12 ♀♀, near Pokfulam Reservoir, from *P. massoniana*, 24.IV.1964; 1 ♀, same loc., from *Litsea glutinosa*, 26.X.1964.

HAWAII: See Thornton (in press).

Peripsocus spinosus Thornton

Peripsocus spinosus Thornton, 1959, Proc. R. Ent. Soc. Lond. (B) **28:** 42, fig. 5, 8, 11, 12, 18; 1962, Trans. R. Ent. Soc. Lond. **114:** 286.

DISTRIBUTION: Hong Kong.

MATERIAL EXAMINED: HONG KONG: collected by Wong. *HONG KONG I.:* 29 ♀♀, 36 ♂♂, Sir Cecil's Ride, from *Pinus massoniana*, 19.I.1962; 3 ♂♂, near Pokfulam Reservoir, 12. III.1962; 6 ♀♀, 1 ♂, same data, 23.III.1962; 44 ♀♀, 22 ♂♂, Mt. Davis Rd., from *P. massoniana*, 19.IV.1962; 3 ♂♂, same loc., 14.V.1962; 43 ♀♀, 14 ♂♂, same loc., from *P. massoniana*, *Casuarina equisetifolia* and *Albizzia lebbek*, 14.IV.1964; 1 ♀, Stubbs Rd., Peak, 300 m, from *C. equisetifolia*, 2.V.1962; 12 ♀♀, near Pokfulam Reservoir, from *P. massoniana*, 3.V.1962; 1 ♂, same loc., 27.VI. 1962; 23 ♂♂, same loc., from *P. massoniana*, 24.IV.1964; 10 ♀♀, 7 ♂♂, Mt. Butler Rd., from *P. massoniana*, 31.XII.1962.

Peripsocus variatus Soehardjan and Hamann

Peripsocus variatus Soehardjan & Hamann, 1959, Idea **12**(1): 4, ♀ fig. 9–11.

The original description is based on 1 female from Bogor, Indonesia, and includes a description of external features. However, the genitalia were not described. In Hong Kong no males have been recorded; a redescription of the female is given below:

♀. (redescription). *Coloration* (after 4 months in alcohol): Vertex pale cream, usual pattern light grayish brown. Epicranial sutures distinct, dark brown. Clypeus light brown with chocolate brown oblique striae leaving a narrow median light brown line. Anteclypeus almost white with brown posterior border. Labrum brown. Gena light cream. Maxillary palp cream, apex and medial surface chocolate brown. Antenna: scape and pedicel pale cream, flagellum buff darkening towards apex. Ocelli pale. Eyes black with white cornea, opacity disappears on storage. Mesothorax: antedorsum light brown, anterior corners and posterior margin pale cream; dorsal lobes light brown, posterior margin pale cream; scutellum pale brown; sutures brown. Metathoracic terga similar. Thoracic pleura light brown. Leg: pale cream, except tibia light brown with pale cream extremities. Fore wing hyaline; a dark chocolate brown spot at either end of pterostigma, and at apex of cell *An*; 2 broad divergent smoky brown bands of uneven intensity from either end of pterostigma towards posterior margin, the basal one not quite reaching it; veins light brown, bordered hyaline. Hind wing hyaline, costal cell light brown; veins light brown, fading towards apical and posterior margins. Abdomen cream, with transverse brown bands ventrally. *Morphology:* Pterostigma of

Table 3. Metric (in mm) and meristic characters of 3 ♀♀ of *Peripsocus reicherti*, of 3 ♀♀ of *Ectopsocus comitus*, of *Peripsocus stenopterus* (♀), and of *Peripsocus anoplus* (♂).

	P. reicherti ♀			*E. comitus* ♀			*P. stenopterus* ♀	*P. anoplus* ♂
B	2.06	1.74	2.00	1.50	1.74	1.36	–	2.02
A	1.470	1.360	1.470	1.135	1.165	1.075	1.590	–
f_1	0.270	0.260	0.265	0.230	0.245	0.210	0.360	–
f_2	0.200	0.190	0.200	0.145	0.145	0.130	0.220	–
Ratio f_1/f_2	1.37	1.35	1.33	1.59	1.68	1.60	1.64	–
Ratio I. O.: D.	3.69	3.40	3.25	4.25	4.73	4.84	3.64	0.65
Fw	1.94	1.92	1.96	1.40	1.30	1.26	2.52	2.44
Hw	1.42	1.40	–	1.10	1.08	1.02	1.84	1.90
Hf	0.370	0.325	0.385	0.340	0.325	0.305	0.505	0.430
Ht	0.665	0.650	0.770	0.535	0.530	0.495	1.005	0.890
t_1	0.210	0.170	0.220	0.180	0.185	0.170	0.240	0.250
t_2	0.080	0.080	0.095	0.080	0.080	0.080	0.145	0.105
Ratio t_1/t_2	2.67	2.19	2.36	2.25	2.34	2.17	1.64	2.38
Ct	14	13	15	7	11	9	16	20
Tr	20	21	21	4	4	4	31	37

fore wing broadened abruptly subapically, apex bluntly angulate, cell granulate; veins *r* and *m* very close together beyond branching of m_2. Subgenital plate (fig. 18) median apical lobe short, trapezoid; setae few, apical. Main plate sclerotization as a broad U; setae few, apical. Gonapophyses (fig. 19): ventral valve styliform apically, void of recurrent setae; dorsal valve broad, with a row of subapical setae; outer valve longer than broad, outer margin bent, a few setae in apical 1/2. Metric and meristic characters as in Table 2.

DISTRIBUTION: Indonesia (Java), Hong Kong.

MATERIAL EXAMINED: HONG KONG: collected by Wong. *HONG KONG I.:* 1 ♀, Lugard Rd., Peak, 400 m, 9.V.1962; 1 ♀, same data, 22.VIII.1962; 1 ♀, H. K. U. compound, from dead leaves, 10.V.1962; 1 ♀, Pokfulam Reservoir Rd., Peak, 400 m, 24.V.1962.

As pointed out by Soehardjan & Hamann this species is unique in wing pattern and in wing coloration; it is also unique in eye coloration. The female genitalia, however, show affinity with *P. similis* Enderlein (Singapore, Hong Kong, Hawaii) differing in the absence of apical spinelets on the dorsal valve, and in the shape of the outer valve.

Peripsocus hongkongensis Thornton and Wong, new species

♀. *Coloration* (after 9 months in alcohol): Vertex cream, usual pattern ill-defined, grayish brown. Sagittal suture dark brown. Frons cream. Clypeus light brown with indistinct oblique brown striae. Anteclypeus dark brown posteriorly, colorless anteriorly. Labrum dark brown. Gena light brown. Maxillary palp brown, apical segment darker. Antenna uniformly brown. Ocelli pale on dark brown protuberance. Eyes black. Mesothorax: Antedorsum brown with light brown anterior corners and posterior margins; a light brown spot at center of dorsum, dorsal lobes brown, posterior margin light brown; scutellum brown; sutures dark brown. Metathoracic terga similar. Thoracic pleura brown. Leg: coxa brown, trochanter and femur light brown, tibia and tarsal segments dark brown in fore and mid legs, brown in hind leg. Fore wing (fig. 22) light brown, darker along *rs* and *m* basal to fusion, and at nodulus, lighter along *m* beyond fusion; except in hyaline area, veins slightly darker than membrane. Hind wing very light brown, costal cell light brown; veins brown, fading towards apical and posterior margins. Abdomen cream, with segmental diffused dark brown pigmentation, very narrow dorsally and ventrally, broad laterally; a narrow, strongly sclerotized band on tergite and sternite 1; apical segment dark brown.

Morphology: Anterior ocellus very small. Subgenital plate (fig. 23): median apical lobe subrectangular with 2 small lobes, apical margin straight medially, with spinelets; sclerotization complete; uniformly covered with small setae. On main plate posterolateral areas of sclerotization and a V-shaped area more anteriorly, a narrow cream line with a dense line of setae between the 2 areas, setae sparse anteriorly, absent posteriorly. Gonapophyses (fig. 24): ventral valve styliform, apex drawn out to a fine point beset with minute setae; dorsal valve apex tapering with apical row of setae and apical field of spines; outer valve well developed, subrectangular, length exceeding 1/2 that of dorsal valve. Metric and meristic characters as in Table 4.

♂. *Coloration* (after 9 months in alcohol): As ♀. *Morphology:* Antenna thicker and with denser setae than in ♀. Hypandrium (fig. 25) simple, setose. Penis frame (fig. 26) closed, slipper-shaped, drawn out to a short beak posteriorly, radula sclerites absent. Abdominal tergite 9 with a small median apical lobe bearing 9–11 (5 specimens) broad truncate teeth (fig. 27). Metric and meristic characters as in Table 4.

DISTRIBUTION: This species has a limited distribution and has been collected frequently and in abundance from a single locality at 300 m, the Peak, Hong Kong Island.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7937) (tube W104.1, slides W104.1a, b), Hong Kong, Lugard Rd., Peak, 400 m, 2.V.1962; allotype ♂ (tube W167.1, slides W167.1a, b), same data as holotype; 7 ♀♀, 5 ♂♂, same data as holotype.

HONG KONG: collected by Wong. *HONG KONG IS.*: 15 ♀♀, in Lugard Rd., Peak, 400 m, 9.V.1962; 1 ♂, 2.V.1963; 7 ♂♂, 20.XII.1963; 39 ♀♀, 18 ♂♂, 4 nymphs, 20.III.1964; 36 ♀♀, 48 ♂♂, 25.III.1964; 35 ♀♀, 25 ♂♂, 14 nymphs, 11.II.1965; 106 ♀♀, 97 ♂♂, 45 nymphs, 19.III.1965; 68 ♀♀, 39 ♂♂, 4 nymphs, 10.VI.1965; 41 ♀♀, 22 ♂♂, 10 nymphs, 6.V.1965.

The vaguely patterned fore wing of this species is common among peripsocids. The male and

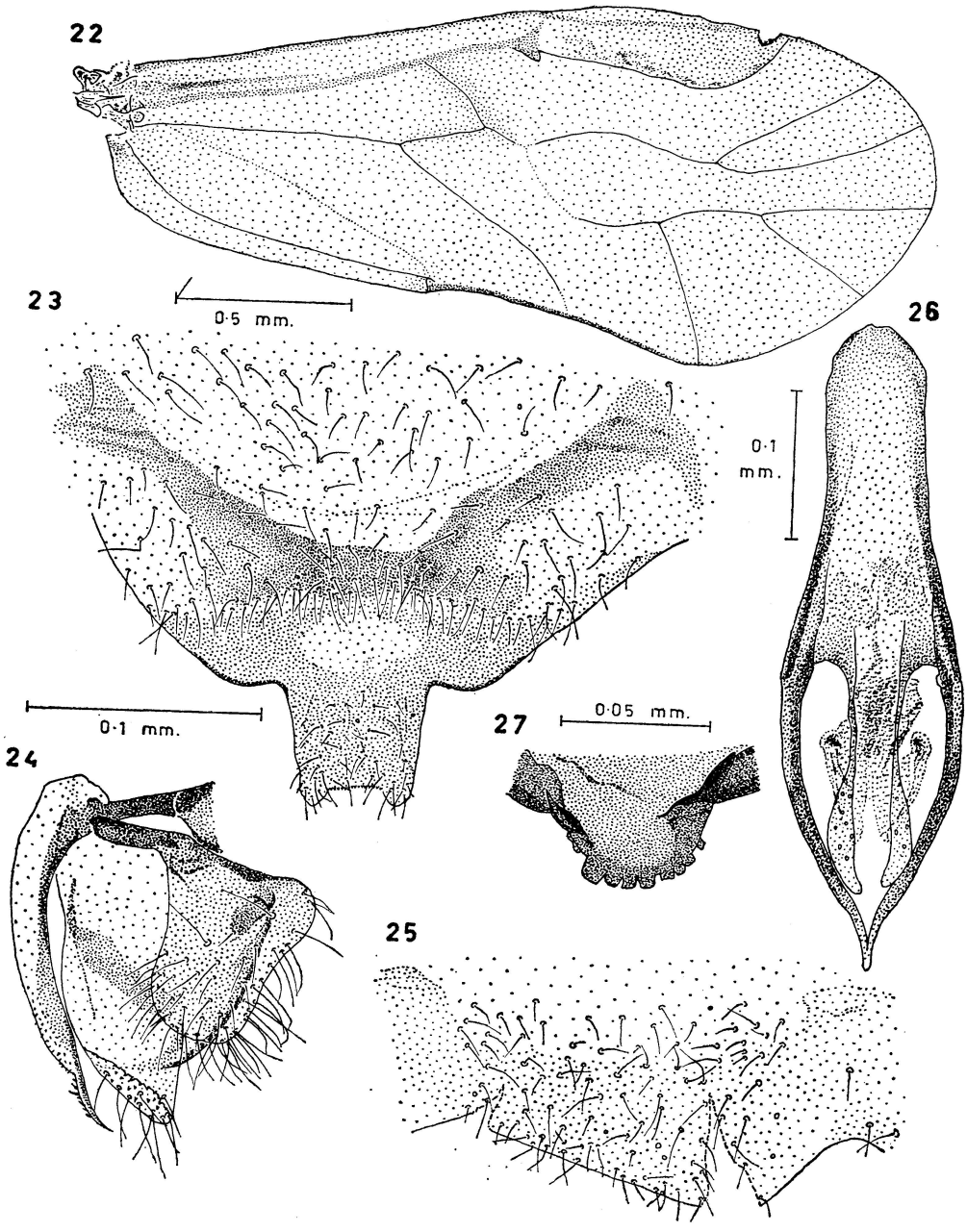


Fig. 22-27. *Peripsocus hongkongensis:* 22, ♂ fore wing; 23, subgenital plate; 24, gonapophyses; 25, hypandrium; 26, penis frame; 27, ♂ caudal comb. (23, 24, 25 to common scale.)

Table 4. Metric (in mm) and meristic characters of 5 ♀♀ and 5 ♂♂ of *Peripsocus hongkongensis*.

	♀					♂				
B	–	–	2.76	2.60	2.38	–	–	2.46	2.34	1.84
A	–	1.465	1.600	1.595	1.595	–	1.725	2.265	2.260	1.860
f_1	0.320	0.265	0.285	0.290	0.305	0.370	0.330	0.410	0.385	0.325
f_2	0.240	0.190	0.220	0.210	0.220	0.280	0.250	0.310	0.305	0.240
Ratio f_1/f_2	1.33	1.38	1.30	1.38	1.39	1.33	1.32	1.32	1.26	1.36
Ratio I. O.: D.	3.45	3.22	3.00	3.27	3.34	0.70	0.81	0.89	0.70	0.81
Fw	2.56	2.56	2.64	2.64	2.46	2.30	2.16	2.66	2.78	2.24
Hw	1.96	1.94	1.96	2.02	1.86	1.82	1.70	2.06	2.08	1.74
Hf	0.490	0.485	0.505	0.505	0.475	0.465	0.435	0.515	0.505	0.475
Ht	0.995	0.980	0.955	1.015	0.880	0.910	0.835	1.045	1.060	0.875
t_1	0.250	0.280	0.260	0.250	0.260	0.265	0.265	0.305	0.305	0.280
t_2	0.120	0.115	0.115	0.115	0.105	0.115	0.105	0.120	0.115	0.115
Ratio t_1/t_2	2.11	2.47	2.29	2.24	2.44	2.35	2.50	2.56	2.70	2.47
Ct	18	17	17	15	17	19	20	25	21	22
Tr	28	26	30	26	28	33	35	39	36	37

female genitalia show a close similarity to those of *P. quercicola* End. (India, Hong Kong, Taiwan, Malaya, Japan). However, *P. hongkongensis* differs in the size of the outer valve, the shape of the posterior margin of the subgenital plate apical lobe, and in the absence of radula sclerites in the penis frame. The female genitalia resemble most closely those of *P. ghesquièrei* Bad. (Congo), but the wing pattern is very different.

Ectopsocopsis cryptomeriae (Enderlein)

Ectopsocus cryptomeriae Enderlein, 1907b, Stett. Ent. Ztg. **68:** 100 (nec. Jentsch 1939); 1908, Zool. Anz. **33:** 771 (distribution).— Okamoto, 1910, Ann. Hist. Nat. Mus. Hung. **8:** 189 (distribution).— Banks, 1937b, Philip. J. Sci. **62:** 267 (distribution).— Takahashi, 1938, Mushi **11:** 13 (distribution).

Ectopsocus pumilis (Banks): Chapman, 1930, J. N. Y. Ent. Soc. **38:** 380 (nec. Banks 1920), plate XIX, fig. 4, 11, 12, plate XXI, fig. 15 (distribution).— Ball, 1931, Mem. Soc. Ent. Belg. **23:** 188, pl. VI fig. 1–6 (further description).— Glick, 1939, U. S. Dept. Agric. Tech. Bull. **673** (distribution).— Sommerman, 1942, Ent. News **53:** 259 (rearing technique); 1943, Psyche **50:** 53, fig. 1–15 (life history).— Gurney, 1950, Pest Control Tech. p. 153 (proposed common name, review of habits).— Mockford, 1950, Proc. Ind. Acad. Sci. **60:** 199 (distribution).

Ectopsocopsis pumilis: Badonnel, 1955, Publ. Cult. Cia. Diamant. Angola **26:** 185 (new combination).— Mockford & Gurney, 1956, J. Wash. Acad. Sci. **46**(11): 364 (distribution.)— Mockford, 1961, Florida Ent. **44**(3): 136 (distribution).

Ectopsocopsis cryptomeriae: Badonnel, 1955, Publ. Cult. Cia. Diamant. Angola **26:** 185 (new combination) from *Ectopsocus.*— Thornton, 1962, Trans. R. Ent. Soc. Lond. **114:** 294, fig. 21–25 (redescription, distribution); 1964, Pacif. Ins. **6:** 288 (distribution in air).— Mockford, 1965, Florida Ent. **48**(2): 115 (synonymy, distribution).— Thornton & Harrell, 1965, Pacif. Ins. **7:** 701 (distribution).

Ectopsocus lepnevae Danks, 1955, Ent. Obozr. **34:** 181, fig. 1–6; 1960, Latvijas Ent. **1:** 32 (distribution).

Ectopsocopsis lepnevae: Thornton, 1962, Trans. R. Ent. Soc. Lond. **114:** 298 (new combination).

♂ (further description). Penis frame (fig. 28; radula everted) outer parameres sharply pointed, inner parameres fused with a double posteromedial projection, 1 tri-lobed, the other simple, low and flat, which extends anteriorly as a weakly sclerotized tongue; 5 radula sclerites — 1 fairly large, pointed and with a very broad base, 1 with an asymmetrical base and a double point, the points curving away from each other, 1 small, low and lobed, and 2 blunt ones.

DISTRIBUTION: Hong Kong, Taiwan, Malaya, Micronesia, Hawaii, Japan, N. America.

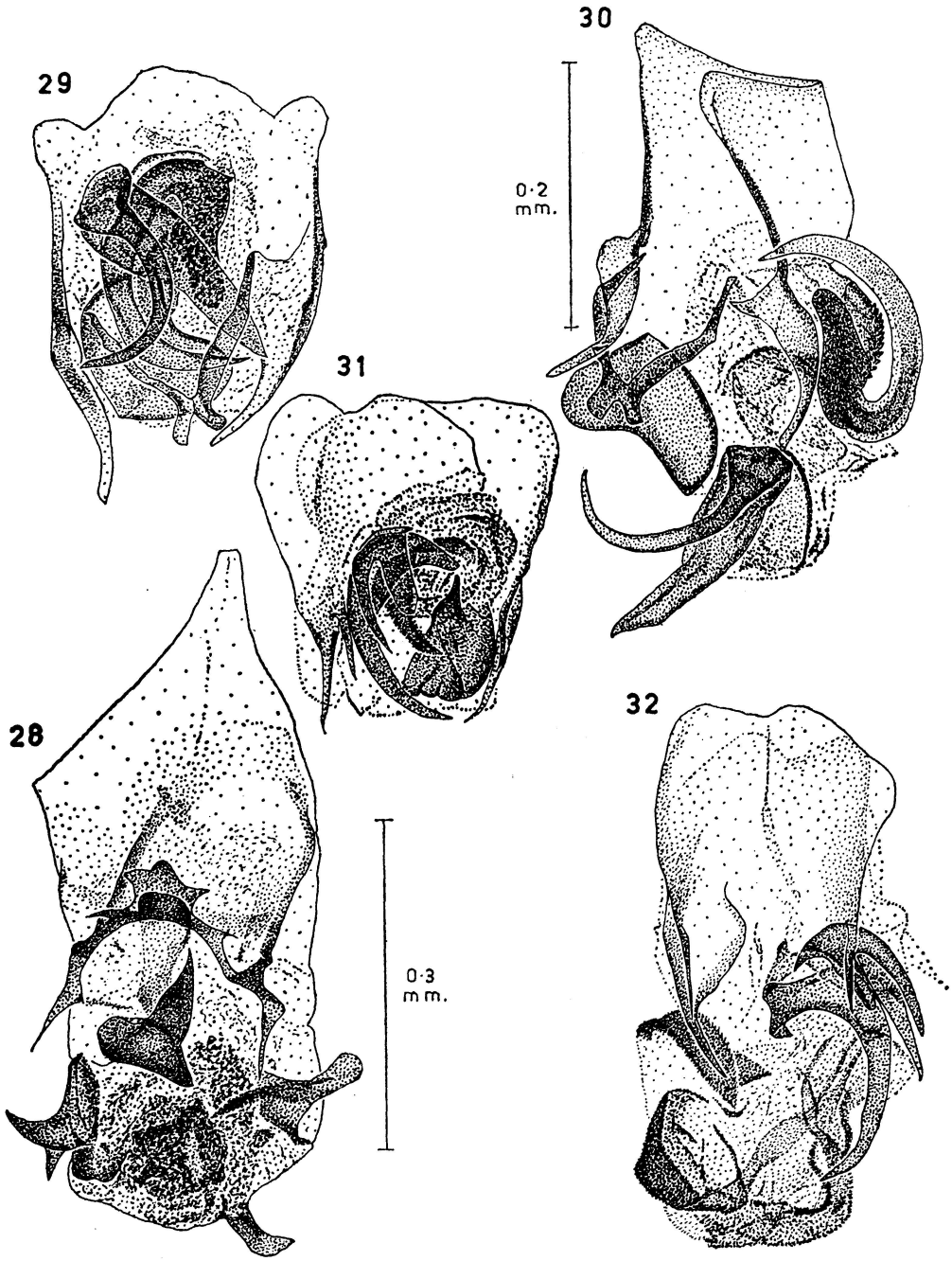


Fig. 28-32. *Ectopsocopsis cryptomeriae:* 28, penis frame with aedeagal sclerites on eversion. *Ectopsocus hirsutus:* 29, penis frame; 30, penis frame with aedeagal sclerites on eversion. *Ectopsocus ornatus:* 31, penis frame; 32, penis frame with aedeagal sclerites on eversion. (All but 28 to common scale.)

MATERIAL EXAMINED: HONG KONG: Collected by Wong unless otherwise stated. *HONG KONG I.:* 1 ♀, near Pokfulam Reservoir, from *Pinus massoniana*, 12.III.1962; 6 ♀♀, 2 ♂♂, same data, 23.III.1962; 2 ♂♂, same data, 5.IV.1962; 59 ♀♀, 14 ♂♂, same data, 3.V.1962; 6 ♀♀, same data, 24.IV.1964; 1 ♂, Pokfulam Reservoir Rd., Peak, 300 m, 24.V.1962; 4 ♀♀, Pokfulam Rd., from *Celtis sinensis* and *Litsea glutinosa*, 1.IV.1962; 1 ♀, Mt. Davis Rd., from *P. massoniana*, 2.IV.1962; 1 ♀, same data, 15.VII.1963; 1 ♀, same loc., 14.VI.1962; 2 ♀♀, same loc., from *P. massoniana* and *C. equisetifolia*, 14.IV.1964; 2 ♀♀, Stubbs Rd., Peak, 400 m, from *Casuarina equisetifolia*, 2.V.1962; 3 ♀♀, 2 ♂♂, Lugard Rd., Peak, 400 m, from unidentified shrub, 2.V.1962; same loc., from *Litsea glutinosa*, 20.III.1964; 1 ♀, same loc., from *C. sinensis*, 6.V.1965; 2 ♀♀, H. K. U. compound, 2.V.1962; 2 ♀♀, 2 ♂♂, same loc., dead leaves, 11.XII.1964; 30 ♀♀, 14 ♂♂, Shouson Hill, 31.V.1962; 6 ♀♀, 4 ♂♂, same loc., 12.VI.1962; 191 ♀♀, 198 ♂♂, 17 nymphs, from culture, 9.VI.1964; 35 ♀♀, 26 ♂♂, same data, 20.VII.1964; 10 ♀♀, 8 ♂♂, same data, 25.X.1964; 4 ♀♀, 2 ♂♂, same data, 18.II.1965. *NEW TERRITORIES:* 1 ♂, Tao Fung Shan, Sha Tin, 27.III.1961, L. Palmer; 1 ♂, from *Rhodomyrtus tomentosus*, Sunshine I., 23.IV.1961, Palmer; 3 ♀♀, 2 ♂♂, Sha Tin, from *P. massoniana*, 7.IV.1962; 28 ♀♀, 13 ♂♂, Sai Kung, from *P. massoniana*, 10.IV.1962; 4 ♀♀, 1 ♂, Lam Chuen, Tai Po, 18.VI.1965.

MICRONESIA: *S. MARIANAS: SAIPAN:* 1 ♂, As Mahetog area, 6.I.1945, Dybas; 1 ♀, Obyan Point, 5.V.1945, Dybas; 13 ♀♀, 2 ♂♂, 7.V.1945, Dybas. *TINIAN:* 2 ♀♀, 1 ♂, ridge 1 km N of Tinian Harbor, beating vegetation, 18.III.1945, Dybas; 1 ♀, 3 ♂♂, same loc., 10.IV. 1945, Dybas; 1 ♀, NW slope of Mt. Lasso, beating vegetation, 25.III.1945, Dybas; 3 ♀♀, same loc., 1.IV.1945, Dybas; 3 ♀♀, ridge SE section, 27.III.1945, Dybas; 4 ♀♀, Tinian, 16–30.IV.1945, Dybas (CM, BISHOP, USNM).

HAWAII: Honokohau, 6.IX.1957, A. M. Nadler.

JAPAN: Collected by Thornton, 4 ♀♀, 4 ♂♂, from *Cryptomeriae japonica*, 17.VIII.1961.

Ectopsocus hirsutus Thornton

Ectopsocus hirsutus Thornton, 1962, Trans. R. Ent. Soc. Lond. **114:** 303, fig. 35–39.

This species was described from 2 females and 2 males, with adequate figures of genitalia of both sexes. However, due to the natural contracted position of the penis bulb, the structure and arrangement of the radula sclerites were not clear. In June 1962, 1 of the males collected was preserved with the penis bulb everted. From the preparation of this specimen it was possible to study the structure of the radula sclerites which were distinctly separated. A description of their structure is provided below.

♂ (further description). Penis frame (fig. 29, 30) with radula sclerites of 3 distinct units: an anterior unit in a longitudinal and medial position consisting of a wide sickle-shaped sclerite directed posteriorly with 2 parallel basal club-shaped appendages lying in its curve, the outer one more heavily sclerotized, the inner one covered with small spines; more posteriorly and towards the right side another unit with a broad oblique sclerite shaped like a penknife blade and a narrow sickle-shaped longitudinal sclerite fused to its base; more posteriorly a 3rd unit consisting of a large, broad, heart-shaped sclerite lying in a slightly oblique position.

DISTRIBUTION: Hong Kong.

MATERIAL EXAMINED: HONG KONG: collected by Wong. *HONG KONG I.:* 13 ♀♀, 3 ♂♂, from *Celtis sinensis* and *Litsea glutinosa*, 1.VI.1962; 2 ♀♀, 3 ♂♂, Shouson Hill, 12.VI.1962; 4 ♀♀, 5 ♂♂, same loc., from dry leaves, 2.XII.1964; 2 ♀♀, 1 ♂, University Hall, 1.VIII. 1962; 1 ♂, from culture, 18.V.1965. *NEW TERRITORIES:* 3 ♀♀, 1 ♂, Lam Chuen, Tai Po, 18.VI.1965.

Ectopsocus meridionalis Ribaga

Ectopsocus briggsi meridionalis Ribaga, 1904, Redia **1:** 294–98.— Badonnel, 1943c, Bull. Soc. Ent. Fr., Paris

48: 100 (distribution).

Ectopsocus meridionalis: Enderlein, 1907b, Stett. Ent. Ztg. **68**b: 101 (description).— Okamoto, 1910, Ann. Hist. Nat. Mus. Hung. **8:** 189 (distribution).— Rosen, 1911, Mitt. Münch. Ent. Ges. **1911** (1, 2): 8–11. (distribution).—Takahashi, 1938, Mushi **11:** 12 (distribution).—Jentsch, 1939, Zool. Jahrb. Syst. **73:** 126fig.— Söfner, 1941, Zool. Jahrb. Abt. Syst. **74:** 323–60.— Ball, 1943, Bull. Mus. Hist. Nat. Belg. **19**(38): 4.— Badonnel, 1943b, Faune Fr. **42:** 100; 1945, Rev. Fr. Ent. **12:** 44 (distribution); 1946b, Rev. Zool. Bot. Afr. **39**(2): 179 (distribution: Congo); 1955, Publ. Cult. Cia. Diamant Angola **26:** 185 (distribution).— Mockford, 1959, Proc. Ent. Soc. Wash. **61**(6): 262 (distribution).— Smithers, 1960, J. Ent. Soc. S. Africa **23**(1): 371 (distribution).— Mockford, 1961, Florida Ent. **44**(3): 136 (distribution).— Badonnel, 1963, Biol. Amer. Austral. **11:** 335 (distribution).

Ectopsocus meridionalis tridentatus Thornton, 1962, Trans. R. Ent. Soc. Lond. **114:** 300, figs. 30, 32, 33.

The insect was reared for 3 generations in the laboratory, with no appearance of males. All eggs developed into females which reproduced parthenogenetically.

DISTRIBUTION: Hong Kong, Taiwan, Hawaii, also widespread.

MATERIAL EXAMINED: HONG KONG: 1 ♀, Stubbs Rd., Peak, 400 m, from *Casuarina equisetifolia*, 2.V.1962; 3 ♀♀, Lugard Rd., Peak, 400 m, 2.V.1962; 14 ♀♀, same data, 9.V.1962; 9 ♀♀, Mt. Davis Rd., 14.V.1962; 5 ♀♀, Pokfulam Reservoir Rd., 400 m, 24.V.1962; 1 ♀, Pokfulam Rd., from *Celtis sinensis*, 1.VI.1962; 1 ♀, Pokfulam Reservoir Rd., Peak, 400 m, 7.V.1964, Wong; 8 ♀♀, from culture, 9.VI.1964.

HAWAII: See Thornton (in press).

Ectopsocus ornatus Thornton

Ectopsocus ornatus Thornton, 1962, Trans. R. Ent. Soc. Lond. **114:** 308, fig. 43–48.— Mockford, 1965, Florida Ent. **48**(2): 112 (distribution).

♂ (further description). Penis frame (fig. 31, 32) outer parameres pointed, inner parameres smaller, pointed, sclerotized, not fused; 2 sickle-shaped radula sclerites, the larger one simple, the smaller one forked, with 1 pointed sickle-shaped prong and 1 straight rounded prong; 1 large posterior pocket-like sclerite; a more anterior spinous flat pointed sclerite.

DISTRIBUTION: Hong Kong, Taiwan, N. America.

MATERIAL EXAMINED: TAIWAN: 1 ♂, Hualien, on *Ficus*, 18.III.1961, E. Schlinger.

HONG KONG: collected by Wong. *HONG KONG I.:* 1 ♀, from *Pinus massoniana*, Sir Cecil's Ride, 19.I.1962; 1 ♀, 1 ♂, Shouson Hill, 31.V.1962; 1 ♀, near Pokfulam Reservoir, 27.VI.1962; 1 ♂, Mt. Davis Rd., from *P. massoniana*, 15.VII.1963; 1 ♀, in bathroom, private house, 6.X.1962; 1 ♀, Hatton Rd. 10.X.1962; 2 ♂♂, Finlay Rd., Peak, 400 m, from *Litsea chinensis*, 11.XI.1964; 24 ♀♀, 17 ♂♂, H. K. U. compound, from dead leaves, 11.XII.1964.

Ectopsocus richardsi (Pearman)

Chaetopsocus richardsi Pearman, 1929, Ent. Mon. Mag. **65:** 105, ♀ (habitat), fig. la-d.— Richards & Herford, 1930, Ann. Appl. Biol. **17:** 367–95 (habitat).— Kimmins, 1941, J. Soc. Brit. Ent. **2**(3): 94 (distribution).— Pearman, 1942, Ent. Mon. Mag. **78:** 290 (new combination).— Zimmerman, 1948, Ins. Hawaii **2:** 233 (distribution), fig.

Ectopsocus richardsi: Pearman, 1942, Ent. Mon. Mag. **78:** 290, fig. 3 (description ♂, new combination).— Mockford & Gurney, 1956, J. Wash. Acad. Sci. **46**(11): 363 (distribution).— Pearman, 1960, Entomologist **93:** 248 (habitat, distribution).—Thornton, 1962, Trans. R. Ent. Soc. Lond. **114:** 300, fig. 31 (habitat, distribution).

DISTRIBUTION: Hong Kong, Hawaiian Is., Galapagos, also widespread.

MATERIAL EXAMINED: HONG KONG: *HONG KONG I.:* 3 ♀♀, 4 ♂♂, 5 nymphs, Kennedy Town godowns, in rice, 21.III.1962.

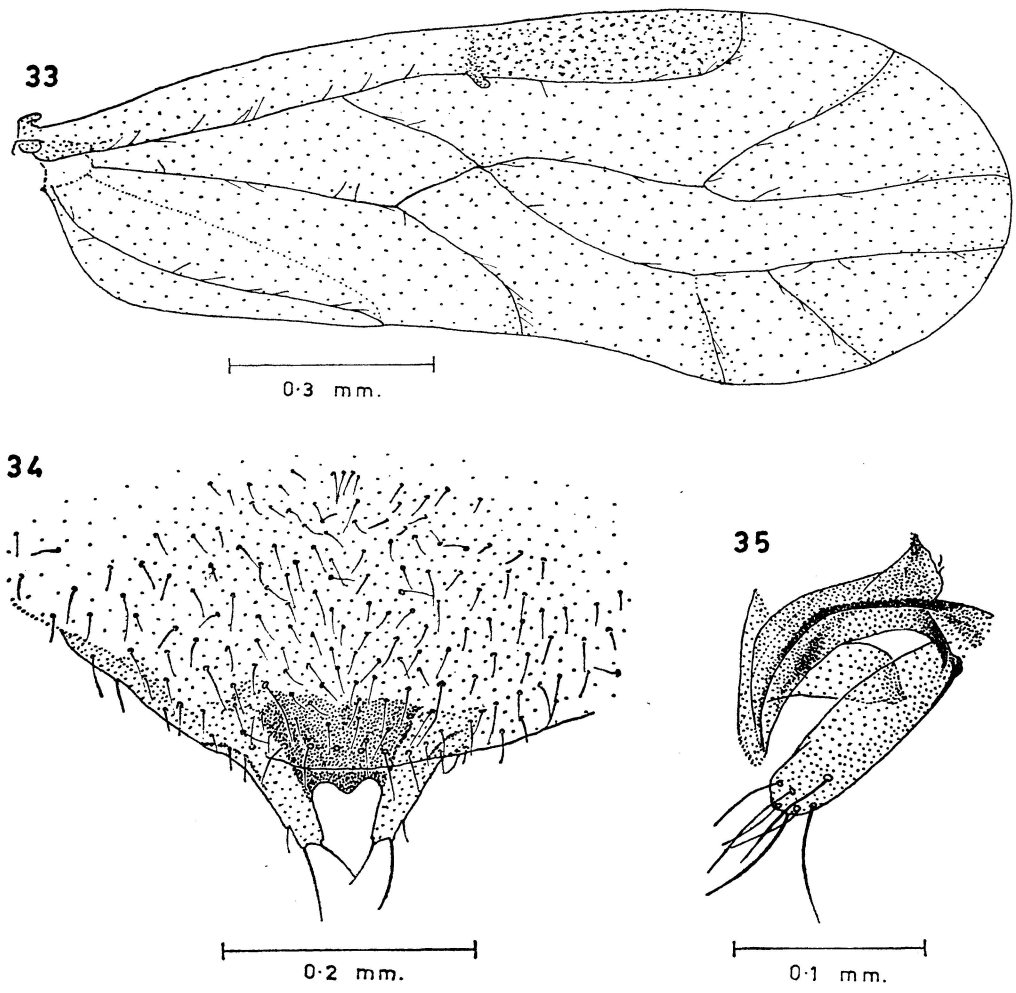
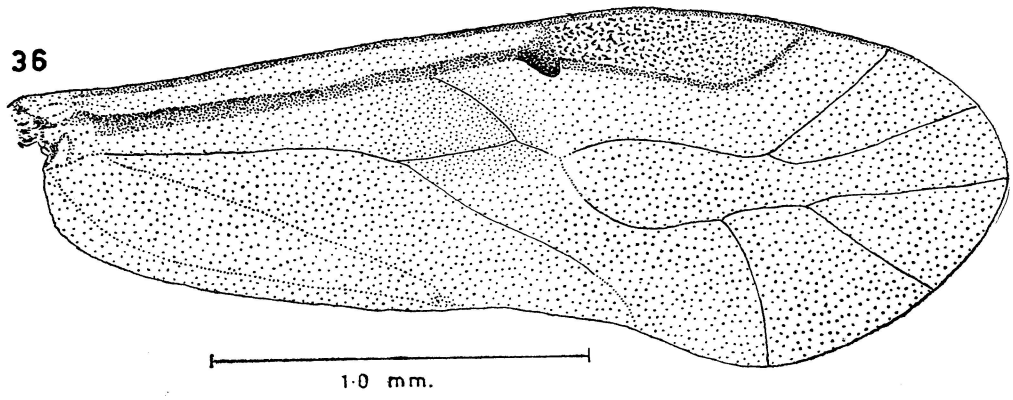


Fig. 33-35. *Ectopsocus comitus* ♀: 33, fore wing; 34, subgenital plate; 35, gonapophyses.

GALAPAGOS: 33 ♀♀, 4 ♂♂, Horneman Farm, 220 m, Isla Santa Cruz, 7.V.1964, Cavagnaro.

Ectopsocus comitus Thornton and Wong, new species

♀. *Coloration* (after 3-1/2 months in alcohol): Head cream, usual pattern faint, light grayish brown. Ocelli pale. Eyes black. Antenna with scape and pedicel cream, flagellum uniformly very light brown. Maxillary palp cream gradually darkening in apical 1/2. Thorax cream, markings hardly discernible. Wings hyaline, veins very light brown, with light brown pigmentation at *rs-m* junction and along apical sections of veins. Leg: uniformly cream. Abdomen pale cream. *Morphology:* Fore wing (fig. 33) margin bare; setae on veins fine, short; pterostigma broader apically, granulate; veins *rs* and *m* meet at a point. Hind wing with 6 very fine, very short marginal setae between radial fork; veins bare. Subgenital plate (fig. 34) with a small median broadly triangular lobe, and 2 narrow slightly convergent apical lobes, each carrying 2 strong apical setae and a small fine seta on lateral margin. Sclerotization on main plate apical in lining between bases of apical lobes, a row of 6–8 (3 specimens) strong subapical setae on main plate, 1 specimen



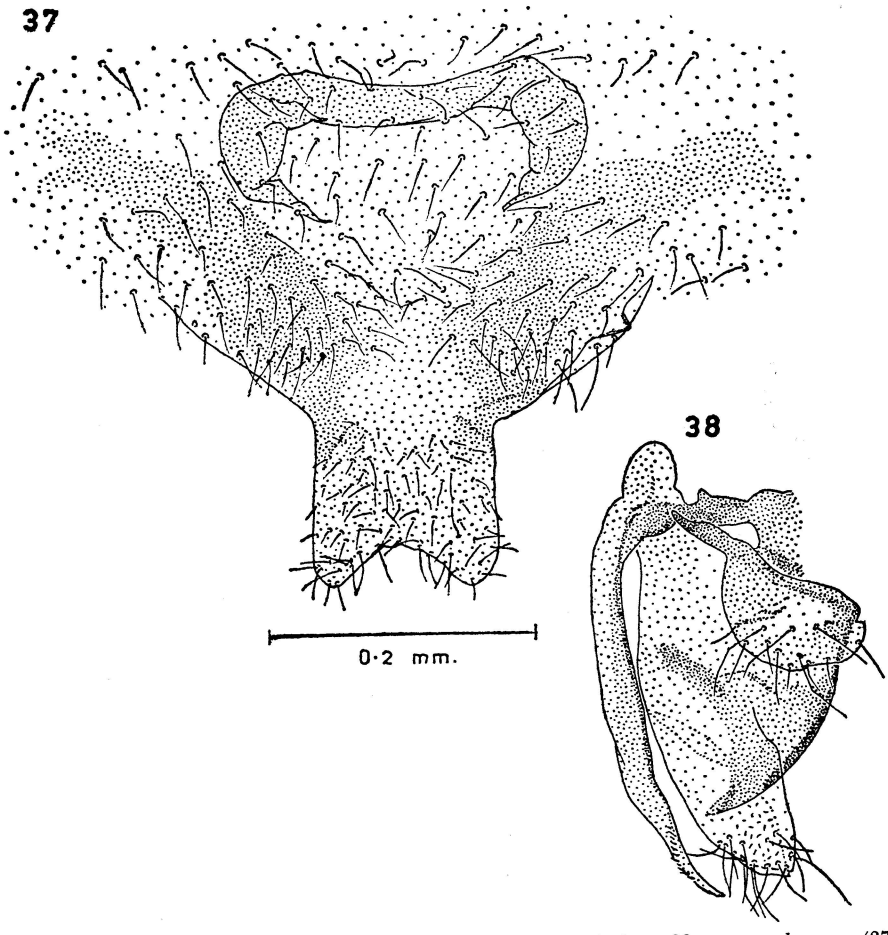


Fig. 36-38. *Peripsocus stenopterus* ♀: 36, fore wing; 37, subgenital plate; 38, gonapophyses. (37, 38 to common scale.)

with an extra seta on median lobe. Gonapophyses (fig. 35): ventral valve narrow, tapering apically; outer valve slightly tapering at both ends, with 4 long and 3 short apical setae. Paraproct with a basal field of 3–4 trichobothria, and median row of 4–5 long setae and a small double spine with unequal members on mesial face. Metric and meristic characters as in Table 3.

♂. Unknown.

DISTRIBUTION: Hong Kong.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7938) (tube W116, slides W116a, b), H. K. U. compound, Hong Kong, on dead leaves, 2.V.1962; 1 ♀, same collecting data, 10.V.1962, Wong; 1 ♀, Mt. Davis Rd., Hong Kong, 14.V.1962, Wong.

E. comitus show some similarity in female genitalic characters to *E. maindroni* Bad. (widespread); it differs, however, in the nature of sclerotization of the subgenital plate and the presence thereon of a small median apical lobe.

Peripsocus singularis Banks

Peripsocus singularis Banks, 1937a, Philip. J. Sci. **62**(3): 267, fig.

P. singularis is a caeciliid which lacks an areola postica (Mockford in litt.)

Peripsocus stenopterus Thornton and Wong, new species

♀. *Coloration* (after 5 yr in alcohol): Vertex cream, usual pattern light grayish brown. Clypeus with light brown oblique striae. Anteclypeus colorless, with brown basal band. Labrum brown. Gena cream. Maxillary palp brown, darkening towards apex, white at joints. Antenna uniformly brown. Ocelli pale on dark brown protuberance. Eyes black. Mesothorax: antedorsum brown with fine light brown line along midline and posterior border; buff spot at center of dorsum, dorsal lobe brown with light brown posterior margin; scutellum light brown; sutures dark brown. Metathoracic terga similar. Thoracic pleura brown. Leg: brown, except trochanter lighter. Fore wing (fig. 36) light smoky brown, slightly darker along *m* and *rs* basal to and at fusion, lighter along *m* beyond fusion; veins brown. Hind wing very light smoky brown in costal cell; veins brown in basal 1/2, fading towards apical and posterior margins.

Morphology: Fore wing (fig. 36) unusually narrow, not very broadened subapically, pterostigma granulate, only very gradually and slightly widened subapically, apex smoothly rounded. Subgenital plate (fig. 37): median apical lobe short, uniformly covered with fine short setae, apex indented; sclerotized at anterior corners. Sclerotization of main plate as oblique streaks not meeting mesially; anterior to usual sclerotization on lining a C-shaped sclerotized fold open posteriorly; an area of main plate immediately anterior to apical lobe without setae, otherwise setose. Gonapophyses (fig. 38): ventral valve styliform, tapering to a point, apical recurrent setae small; dorsal valve apically with setae and field of minute spinelets; outer valve short, broad, apical 1/2 with a few small fine setae. Metric and meristic characters as in Table 3.

♂. Unknown.

DISTRIBUTION: Taiwan.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7939) (tube T1.1, slides T1.1a, b), Wushe (= Musha), Taiwan, 13.III.1961, Schlinger.

This species has a type of wing pattern common among peripsocids, but the fore wing is more pointed, longer and narrower than usual. The pattern of sclerotization on the main plate of the subgenital plate has 2 oblique streaks not meeting mesially; and the shape of the outer valve is also unusual; the C-shaped fold on the lining is unique.

MALAYAN SUBREGION

Peripsocus fasciatus Thornton

See p. 20.

Peripsocus pauliani Badonnel

See p. 20.

Peripsocus quercicola Enderlein

See p. 11.

Peripsocus reicherti Enderlein

Peripsocus reicherti Enderlein, 1903b, Ann. Hist. Nat. Mus. Hung. **1:** 290, Taf. VII, fig. 46; 1931, Trans. Linn. Soc. Lond. (Zool) (2) **19:** 217 Taf. 14, fig. 62 (further description; distribution).— Soehardjan & Hamann, 1959, Idea **12**(1): 5, fig. 12–16 (description ♂; distribution).

This species was first described by Enderlein from a number of female and male specimens collected from Singapore. Enderlein noted the possession of large eyes by the male from specimens collected from Seychelles in 1931. In these reports as well as that by Soehardjan & Hamann (1959) no reference to the genitalia was made. In this study no less than 4 different species with similar wing pattern have been examined, 3 represented by females only, 1 by males only. Thornton examined and dissected the holotype female of *P. reicherti* in the British Museum (Nat. Hist.) and was thus able to establish the identity of this species.

The allotype male is unfortunately damaged, but a caudal comb with 4 irregular teeth, similar to that of *P. spinosus*, is present. As no males are represented in this study a brief redescription based on females only is given below.

♀ (redescription). *Coloration* (after 1 yr in alcohol): Vertex cream, usual pattern light brown, spots coalescing. Sagittal suture dark brown. Clypeus with faint, indistinct, oblique lighter brown striae. Anteclypeus brown basally, almost colorless apically. Labrum brown. Gena cream. Maxillary palp light brown basally, darkening to brown apically. Antenna uniformly light brown. Ocelli pale on dark brown protuberance. Eyes black. Mesothoracic terga light brown, a cream spot at center of notum; sutures distinct, brown in parts. Metathoracic terga similar. Thoracic pleura light brown. Leg with basal segments almost white, tibia and tarsal segments light brown. Fore wing with basal 1/6 light brown, a large, rounded similarly pigmented spot basal to pterostigma, extending from margin to margin, bordered by a wide hyaline band on either side, and apical 1/4 of wing pale brown; veins brown, lighter in hyaline areas. Hind wing hyaline, costal cell pale brown, a large pale brown spot at center; veins brown in pigmented area, lighter in hyaline areas. Abdomen cream, with wide pale reddish-brown bands dorsally and laterally. Apical segment light brown.

Morphology: Head sclerites shiny. Pterostigma of fore wing granulate, apex smoothly rounded. Subgenital plate (fig. 20) with a median subrectangular apical lobe covered except at base with fine short setae. Sclerotization in apical lobe lateral, in main plate U-shape. Apical lobe margins convex, posterior margin carrying spinelets. A suggestion of V-shaped fold in main plate posterior to sclerotization. Gonapophyses (fig. 21): ventral valve styliform, constricting sharply at apex to a fine point, apical recurrent setae minute; dorsal valve with a subapical row of long setae; outer valve small, subrectangular, covered in outer and apical region with a number of long setae. Metric and meristic characters as in Table 3.

DISTRIBUTION. Indonesia, Malaya, Seychelles.

MATERIAL EXAMINED: MALAYA: 3 ♀♀, near Simpang Pulai, Ipoh, 29.VII.1963, Lee.

P. reicherti is closely related to *P. quadripunctatus* Bad. (Angola) in wing pattern and in female genitalia, differing in the pigmentation of cell *An* in the fore wing, size of the median brown spot in the fore and hind wings; in sclerotization of the apical lobe of the subgenital plate and the dorsal valve of the gonapophyses; and in the shape of the outer valve of the gonapophyses. It also resembles *P. brachyura* (Palawan) and *P. valvulus* (Malaya) in wing pattern, but differs from both in genitalic characters. It also shows relationship in fore wing pattern and shape of pterostigma to *P. constrictus* (Malaya). The latter, however, lacks pigmentation at the base and apex of the fore wing, and in the hind wing.

Peripsocus anoplus Thornton and Wong, new species

♂. *Coloration* (after 1 yr in alcohol): Vertex light brown, usual pattern darker grayish brown. Sagittal suture dark brown. Frons light brown, unmarked. Clypeus with faint brown oblique striae. Anteclypeus

posterior margin brown otherwise almost colorless. Labrum brown. Gena brown dorsally, light brown ventrally. Maxillary palp light brown, apical segment darker. Antenna with basal 3 segments uniformly light brown, rest broken off. Ocelli pale, on dark brown protuberance. Eyes black. Mesothoracic terga light brown with a buff spot at center of notum and buff posterior margin to dorsal lobes; sutures brown. Metathoracic terga similar. Thoracic pleura light brown. Leg: cream, except coxa and basal 1/4 of tibia brown. Fore wing (fig. 39) very pale brown, slightly darker in a broad transverse band basal to pterostigma, hyaline along *m* beyond fusion with *rs*; veins brown, except in hyaline areas very light brown. Hind wing paler brown, slightly darker in costal cell; veins brown in basal 1/2, fading towards apex. Abdomen cream, apical segment brown.

Morphology: Antenna fairly thick with dense short setae. Apical segment of maxillary palp long, slender. Pterostigma in fore wing (fig. 39) finely granulate, apex smoothly rounded. Hypandrium (fig. 40) simple, setose. Penis frame (fig. 41) closed, broadened and squared anteriorly, produced to a beak posteriorly; radula sclerites absent. Tergite 9 without posterior projection, no caudal comb. Metric and meristic characters as in Table 3.

♀. Unknown.

DISTRIBUTION: Malaya.

MATERIAL EXAMINED: Holotype ♂ (BISHOP 7940) (tube Ma4.1, slides Ma4.1a, b), Mt. Brinchang, 1500 m, Pahang, Malaya, light trap, 17.III.1963.

This species shows some similarity to *P. crenulatus* (New Guinea) in wing pattern, but differs in head pattern, in lack of pigmentation of pterostigma apex and in genitalia. Its penis frame resembles somewhat that of *P. fasciatus* (Malaya, Hong Kong) but it differs in the lack of radula sclerites.

Peripsocus circinus Thornton and Wong new species,

♀. *Coloration* (after over 4 yr. in alcohol): Vertex cream, usual pattern very light grayish brown. Sagittal suture dark brown. Frons unmarked. Clypeus with very faint, very light brown oblique striae. Anteclypeus colorless. Labrum brown. Gena cream. Maxillary palp cream basally, darkening to very light brown apically. Antenna very light brown. Ocelli pale on dark brown protuberance. Eyes black. Mesothorax light brown, with a fine cream median longitudinal line on antedorsum, a small cream patch at anterior corner of antedorsum, a small cream spot in center of dorsum; sutures distinct, brown. Metathoracic terga similar. Thoracic pleura light brown. Leg: basal segments cream, tibia and tarsal segments very light brown. Fore wing (fig. 42) almost hyaline, with a very light brown wide transverse band from stigmasac to nodulus; veins very light brown, darker in pigmented area. Hind wing almost hyaline; veins very light brown. Abdomen cream, apical segment light brown.

Morphology: Pterostigma of fore wing (fig. 42) granulate, apex smoothly rounded. Subgenital plate (fig. 43) apical lobe small, covered with fine setae, apical margin slightly indented, sclerotization as 2 median subparallel lines. Sclerotization of main plate V-shaped, symmetrical lateral pocket-like projection of lining bordered laterally and posteriorly by sclerotization of less intensity; setae concentrated in a curved row, absent in posterior area, sparse anteriorly. Gonapophyses (fig. 44): ventral valve styliform, tapering to a point apically, apical recurrent setae minute; dorsal valve apex tapering, apically with a field of minute spinelets, and a row of fine setae; outer valve ovoid, about 1/2 length of dorsal valve. Metric and meristic characters as in Table 5.

♂. Unknown.

DISTRIBUTION: Malaya.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7941) (tube 604.1, slides 604.1a, b), Gombak Forest Res., 20 km N of Kuala Lumpur, Selangor, Malaya, water trap, 42 m platform, 21.I.1962.

This species is related to *P. reicherti* End. (Malaya, Indonesia, Seychelles), *P. quadripunctatus* Bad. (Angola), *P. brachyura* (Palawan), *P. valvulus* (Malaya), and *P. constrictus* (Malaya) in fore wing pattern, but differs from them in that the pigmented area is a band not a rounded spot; it further differs from them in female genitalic characters.

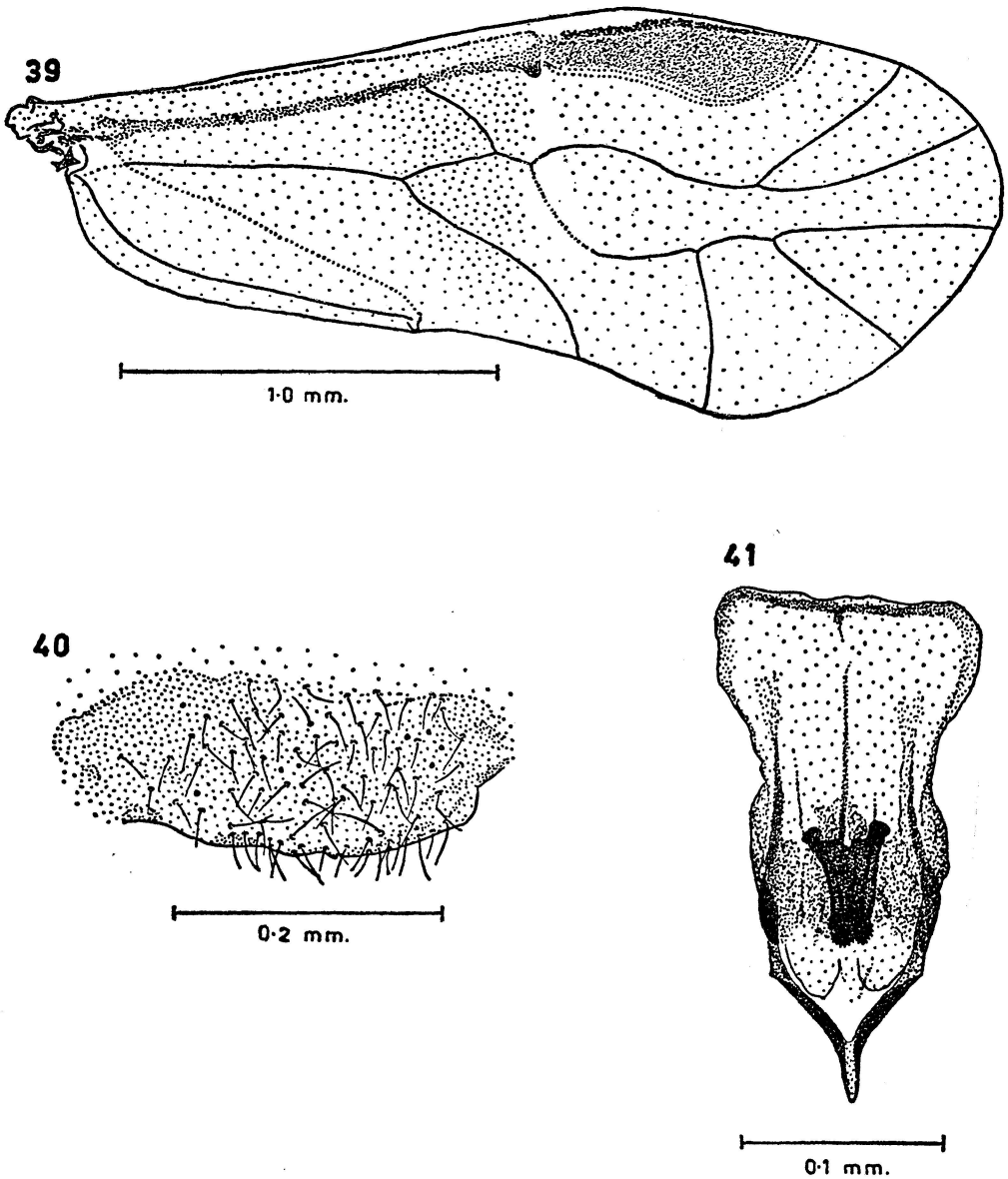


Fig. 39-41. *Peripsocus anoplus* ♂: 39, fore wing; 40 hypandrium; 41, penis frame.

Peripsocus constrictus Thornton and Wong, new species

♂. *Coloration* (after 2 yr in alcohol): Vertex buff, usual pattern pale grayish brown. Sagittal suture dark brown. Clypeus with very faint, indistinct, very light brown oblique striae. Anteclypeus light brown basally, almost colorless apically. Labrum brown. Gena buff. Maxillary palp buff. Antenna buff. Ocelli pale on dark brown protuberance. Eyes black. Mesothoracic terga buff with dorsal lobes darker;

Table 5. Metric (in mm) and meristic characters of *Peripsocus circinus* (♀), *P. constrictus* (♂), *P. hiatus* (♂), *P. selene* (♀), *P. stigmatus* (♀), and of *P. valvulus* (♀).

	P. circinus (♀)	*P. constrictus* (♂)	*P. hiatus* (♂)	*P. selene* (♀)	*P. stigmatus* (♀)		*P. valvulus* (♀)
B	2.00	1.92	–	1.56	1.52	1.54	1.86
A	1.245	2.120	–	–	0.965	1.000	1.245
f_1	0.240	0.330	0.205	0.150	0.160	0.145	0.220
f_2	0.160	0.280	0.145	0.105	0.115	0.120	0.145
Ratio f_1/f_2	1.16	1.19	1.41	1.44	1.41	1.22	1.50
Ratio I. O.: D.	3.43	0.53	0.50	3.33	1.60	2.77	2.94
Fw	1.96	2.36	1.48	1.62	1.66	1.60	1.80
Hw	1.48	1.84	1.16	1.26	1.30	1.26	1.36
Hf	0.345	0.475	0.285	0.280	0.265	0.280	0.370
Ht	0.660	0.855	0.605	0.505	0.545	0.530	0.720
t_1	0.165	0.265	0.170	0.140	0.125	0.140	0.185
t_2	0.085	0.105	0.085	0.080	0.075	0.080	0.095
Ratio t_1/t_2	1.92	2.50	2.00	1.75	1.73	1.75	2.07
Ct	14	18	16	10	11	11	14
Tr	18	34	27	22	20	20	23

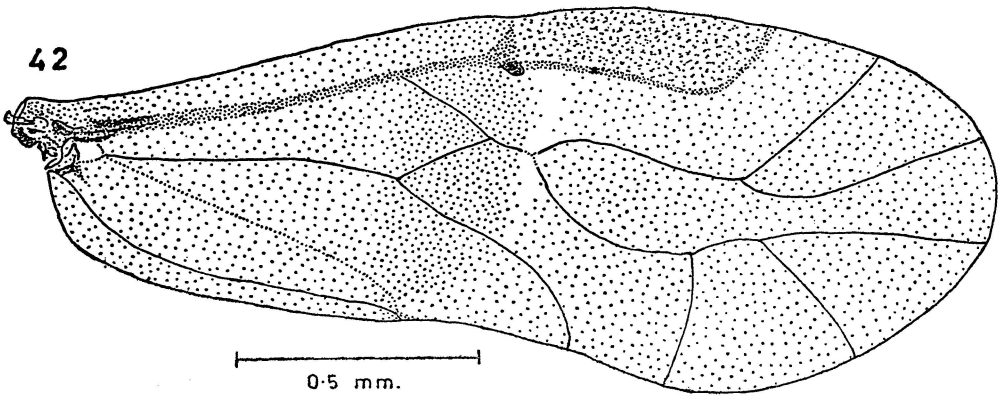
sutures distinct, brown. Metathoracic terga similar. Thoracic pleura buff. Leg: basal segments almost white, tibia and tarsal segments very light brown. Fore wing (fig. 45) almost hyaline; a large rounded median very light brown spot basal to pterostigma, extending almost from anterior margin to posterior margin; veins brown in pigmented area otherwise almost hyaline. Hind wing hyaline, very brown in costal cell; veins brown in center of wing (possibly area occupied by a light brown spot which has faded with storage) otherwise hyaline. Abdomen cream. *Morphology:* Ocellar protuberance elongate anteroposteriorly. Antenna thick, with dense setae. Pterostigma in fore wing (fig. 45) granulate, apex smoothly rounded. Hypandrium (fig. 46) simple, setose. Penis frame (fig. 47) closed, slipper-shaped, constricted subanteriorly, produced into a fine short beak posteriorly, 3 slender radular sclerites. Abdominal tergite 9 with a small posterior median rounded lobe with irregular margin, suggesting incipient teeth of caudal comb (fig. 48). Metric and meristic characters as in Table 5.

♀. Unknown.

DISTRIBUTION: Malaya.

MATERIAL EXAMINED: Holotype ♂ (BISHOP 7942) (tube 613.1, slides 613.1a, b), Mt. Brinchang, Malaya, 1700 m, 12.XII.1961.

The fore wing pattern and shape of pterostigma of this species closely resembles that of *P. reicherti* End. (Malaya, Indonesia, Seychelles). However, it lacks the pigmentation at the fore wing base and apex, as well as in the hind wing. This lack may be due to prolonged storage in alcohol. The caudal comb resembles that of the type specimen of *P. reicherti* (the allotype ♂ of *P. reicherti* is damaged and of the genitalic characters only the caudal comb is available for study). The male genitalia of *P. constrictus* closely resembles those of *P. quercicola* End., differing in the penis frame being constricted subanteriorly, the aedeagal sclerites being more slender; and the caudal comb having incipient teeth. The wing pattern shown by *P. constrictus* is shared by no less than 4 species, 3 of which are known from females only. The characteristics of the male genitalia of *P. reicherti* are unknown. This specimen is much larger than and was not collected with the *P. reicherti* female before us; it is thus described as a new species. It is nevertheless possible, though improbable, that it is the male of *P. reicherti*. Further collections from Malaya may settle this point.



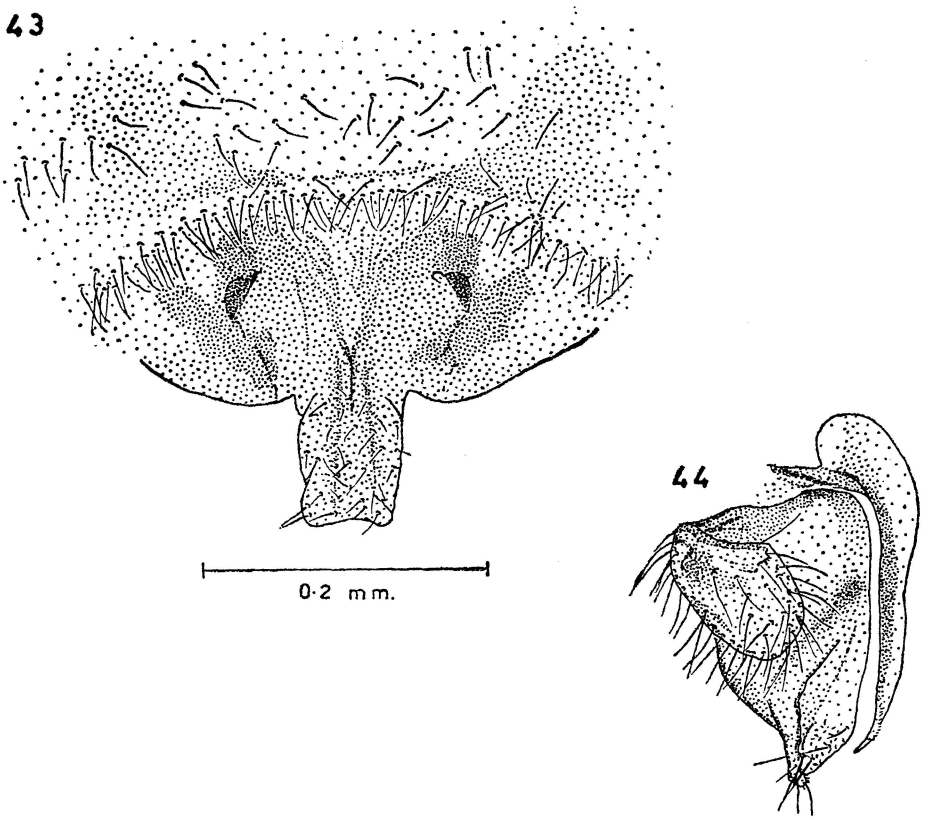


Fig. 42-44. *Peripsocus circinus* ♀: 42, fore wing; 43, subgenital plate; 44, gonapophyses. (43, 44 to common scale.)

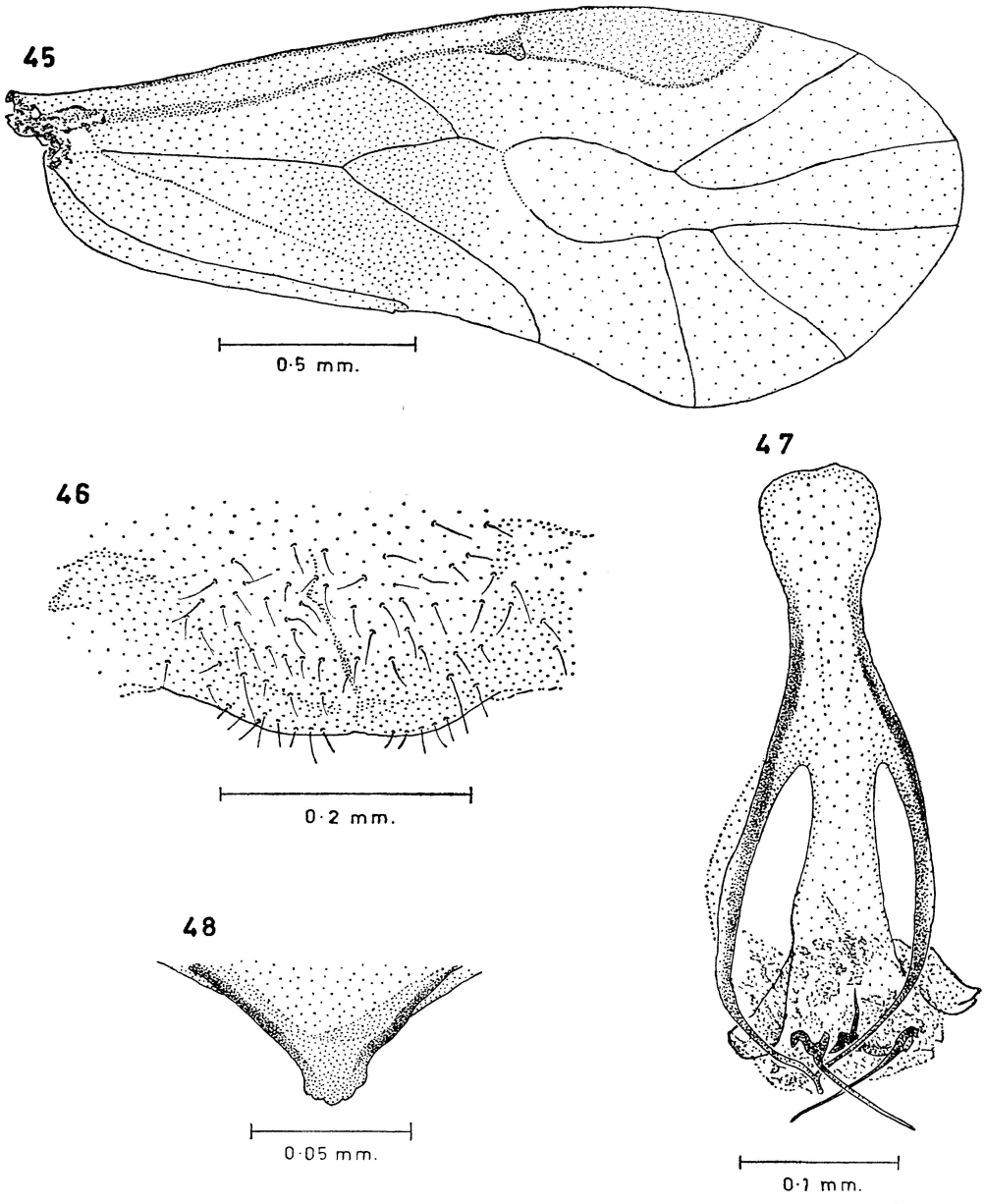


Fig. 45-48. *Peripsocus constrictus* ♂: 45, fore wing; 46, hypandrium; 47, penis frame; 48, caudal comb.

Peripsocus hiatus Thornton and Wong, new species

♂. *Coloration* (after 1 yr in alcohol): Vertex buff, usual pattern light brown. Clypeus with light brown oblique striae leaving a buff posterior border. Anteclypeus almost colorless. Labrum brown. Gena buff. Maxillary palp light brown, apical segment darker. Antenna uniformly light brown. Ocelli pale on dark brown protuberance. Eyes black. Mesothorax: antedorsum light brown with a fairly wide buff

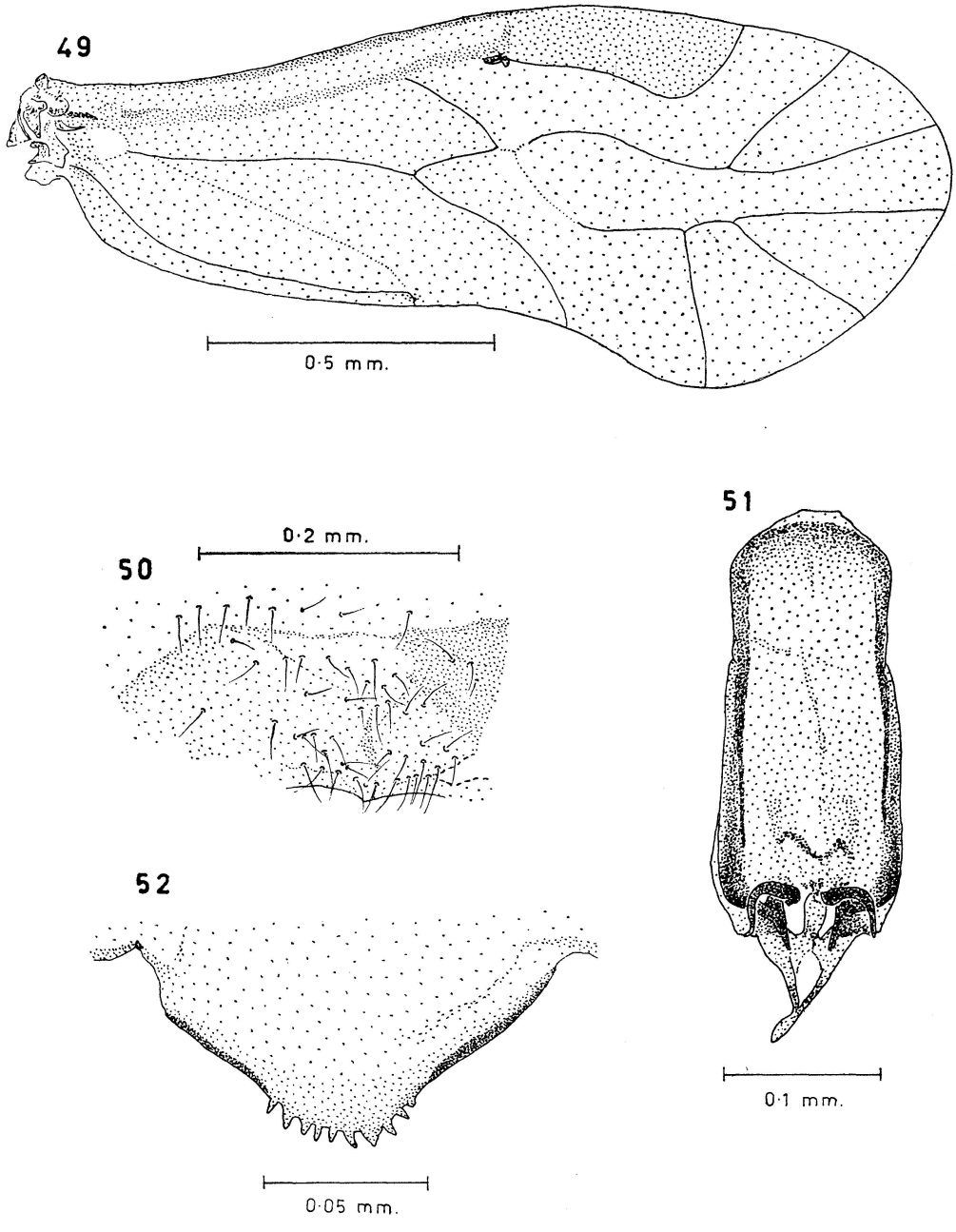


Fig. 49-52. *Peripsocus hiatus* ♂: 49, fore wing; 50, hypandrium; 51, penis frame; 52, caudal comb.

line along mid-line and along posterior border; dorsal lobes light brown with a very wide buff posterior border; scutellum buff; sutures indistinct. Metathoracic terga similar. Thoracic pleura light brown. Leg: coxa light brown, trochanter and femur cream, tibia and tarsal segments light brown. Fore wing (fig. 49) uniformly very light smoky brown except a hyaline area along *m* beyond fusion with *rs*; veins light brown. Hind wing almost hyaline, costal cell very light brown; veins light brown.

Morphology: Hypandrium (fig. 50) simple, setose. Penis frame (fig. 51) closed, sides subparallel, drawn out posteriorly into a large hollow beak. Two pairs of radula sclerites, 1 bent at right angles, the other fitted into its angle. Abdominal tergite 9 with a broad subtriangular posterior projection bearing 10 irregular, small, bluntly pointed teeth apically (fig. 52). Metric and meristic characters as in Table 5.

♀. Unknown.

DISTRIBUTION: Malaya.

MATERIAL EXAMINED: Holotype ♂ (BISHOP 7943) (Ma2.1, slides Ma2.1a, b), Gombak Forest Res., Malaya, from porcupine M02326.

This species is related in male genitalic characters to *P. bicornis* Th. (H. K.), and *P. badonneli* Smithers (Africa); it differs, however, in the beak and radula sclerites of the penis frame, and in the caudal comb.

Peripsocus selene Thornton and Wong, new species

♀. *Coloration* (after 1 yr. in alcohol): Vertex light buff, usual pattern very faint, light grayish brown. Clypeus with very faint light brown oblique striae. Anteclypeus brown basally, colorless apically. Labrum brown. Gena light buff. Maxillary palp very light brown. Antenna uniformly very light brown. Ocelli pale, on dark brown protuberance. Eyes black. Mesothoracic terga light brown with a fine cream line along mid-line of pronotum, 2 small cream patches at anterior corners of pronotum, and a small cream patch at center of notum; sutures distinct, brown. Metathoracic terga similar. Thoracic pleura light brown. Leg: coxa and trochanter cream, femur cream in basal 1/2, very light brown in apical 1/2, tibia and tarsal segments very light brown. Fore wing (fig. 53) brown with 2 distinct hyaline areas, 1 basal to nodulus extending anteriorly to $m+cu$, the other occupying basal 1/2 of pterostigma extending posteriorly to *rs* then as a narrow strip along *m* beyond its fusion with *rs*, a small hyaline spot at tip of cu_1, and a narrow strip of very light pigmentation along apex; pigmentation heaviest subapically except along veins; veins darker brown than membrane in pigmented areas, very light brown in hyaline areas. Hind wing light brown, darker in costal cell and apical 1/2, leaving a very narrow strip of very light brown along veins; veins brown in basal 1/2, lighter in apical 1/2. Abdomen cream with very wide brown bands. Apical segment dark brown.

Morphology: Fore wing (fig. 53) pterostigma broadened subapically, apex bluntly angulate. Subgenital plate (fig. 54) median apical lobe broad, apex deeply indented and beset with minute spinelets, 2 low rounded projections on either side of apical lobe; on each sublobe of apical lobe 5–6 fine setae in a more or less longitudinal line; sclerotization lateral. Sclerotization of main lobe diverging anteriorly. Gonapophyses (fig. 55): ventral valve styliform, tapering to a point, apical recurrent setae minute; dorsal valve narrow, apex tapering, with an oblique subapical row of 5 setae; outer valve small, subconical, with less than 10 fine setae. Metric and meristic characters as in Table 5.

♂. Unknown.

DISTRIBUTION: Malaya, Palawan.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7944) (tube L47.4, slides L47.4a, b), near Simpang Pulai, Malaya, 29.VII.1963, Lee.

PALAWAN: 2 ♀♀, Aborlan, coconut thatch, 17.IV.1965, Thornton.

This species is distinctive in wing pattern and genitalic characters. The incipient 2-pronged nature of the apical lobe of the subgenital plate is intermediate between those of *P. spinosus* Th. (Hong Kong) and *P. fasciatus* Th. (Hong Kong, Malaya). The narrow and tapering dorsal valve, however, has no parallel in peripsocids.

Peripsocus stigmatus Thornton and Wong, new species

♀. *Coloration* (after 1 yr in alcohol): Vertex light buff, usual pattern light grayish brown. Sagittal

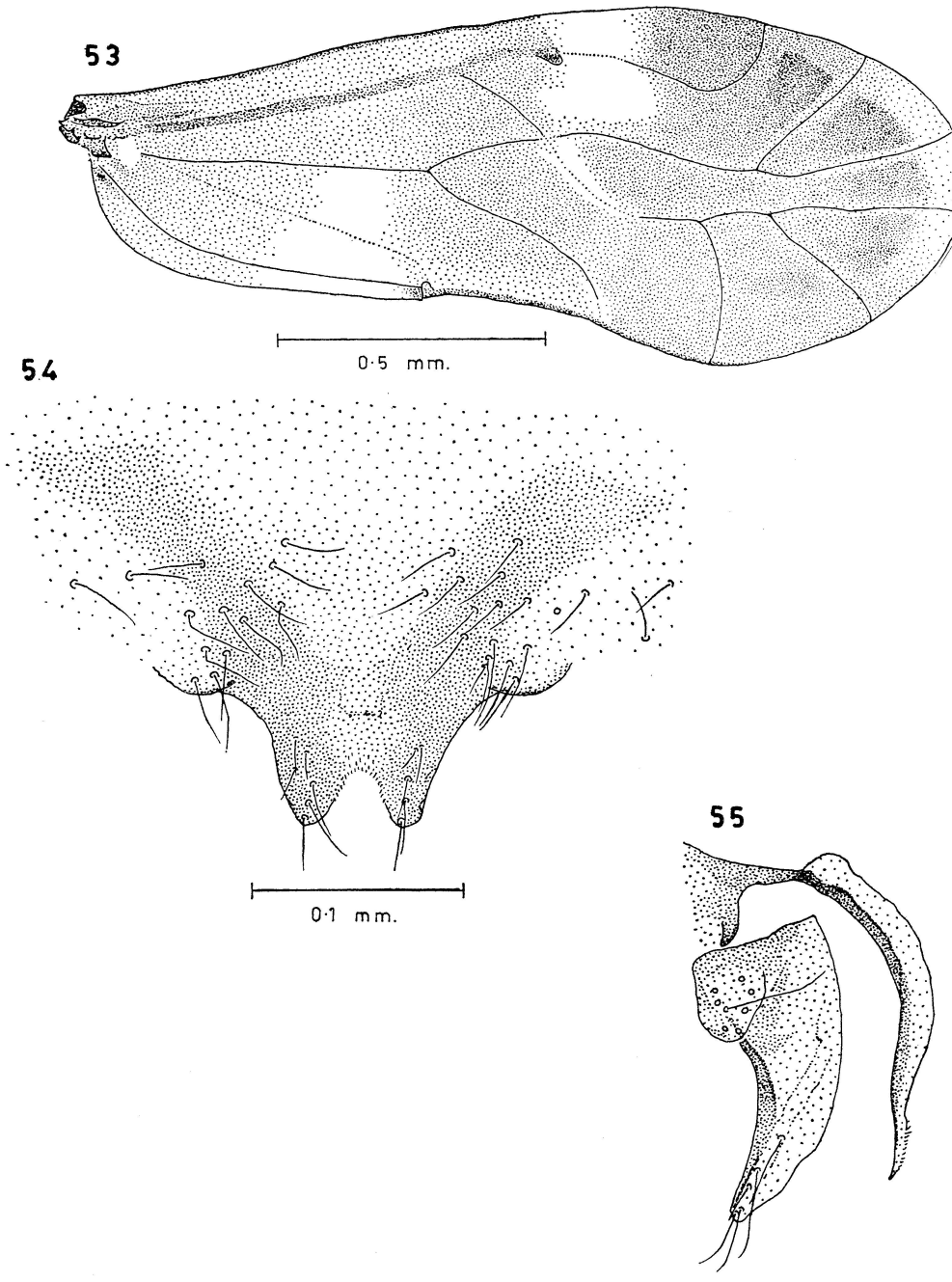


Fig. 53-55. *Peripsocus selene* ♀: 53, fore wing; 54, subgenital plate; 55, gonapophyses. (54, 55 to common scale.)

suture dark brown. Clypeus with light brown oblique curved striae. Anteclypeus colorless with a narrow, brown basal band. Labrum brown. Gena light buff, light brown between orbit and antennal socket. Maxillary palp uniformly brown. Antenna uniformly brown. Ocelli pale on dark brown protuberance. Eyes black. Mesothorax: a continuous cream line along mid line throughout entire length; antedorsum brown, anterior corners cream, dorsal lobes brown, posterior border cream; scutellum brown; sutures distinct, dark brown. Metathoracic terga similar. Thoracic pleura brown. Leg: brown, except trochanter and femur light brown. Fore wing (fig. 56) smoky brown, slightly darker in basal 1/2 of cell *An*, and along *rs* and *m* basal to fusion, and lighter along *m* beyond fusion with *rs;* veins brown, darker than membrane. Hind wing light smoky brown, darker in costal cell and lighter towards apex; veins brown, lighter in apical 1/2. Abdomen cream with diffused brown pigmentation. Apical segment brown.

Morphology: Pterostigma of fore wing (fig. 56) finely granulate, apex bluntly angulate. Subgenital plate (fig. 57) with short median apical lobe bearing 6 fairly long setae and a few short setae apically; sclerotization complete, very strong in basal corners. Main plate with sclerotization V-shaped with a very strong median ovoid patch just basal to apical lobe. Gonapophyses (fig. 58): ventral valve styliform, apex tapering to a fine point, recurrent setae few, minute; dorsal valve with large apical field of spines and a row of apical setae; outer valve well developed, subrectangular, about 1/2 length of dorsal valve, sparsely covered with setae. Metric and meristic characters as in Table 5.

♂. Unknown.

DISTRIBUTION: Malaya.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7945) (tube L47.5, slides 47.5a, b), near Simpang Pulai, Ipoh, Malaya, 29.VII.1963, Lee; paratype 1 ♀, same data.

The vaguely patterned fore wing of this species is common in peripsocids. Its female genitalia show some similarity to those of *P. ghesquierei* Bad. (Congo), *P. mokotensis* Bad. (Congo), and *P. camerunus* Bad. (Camaroons). It differs from the first in fore wing pattern and in the shape of the dorsal valve apically, and from the last 2 in the larger number of apical setae on the dorsal valve.

Peripsocus valvulus Thornton and Wong, new species

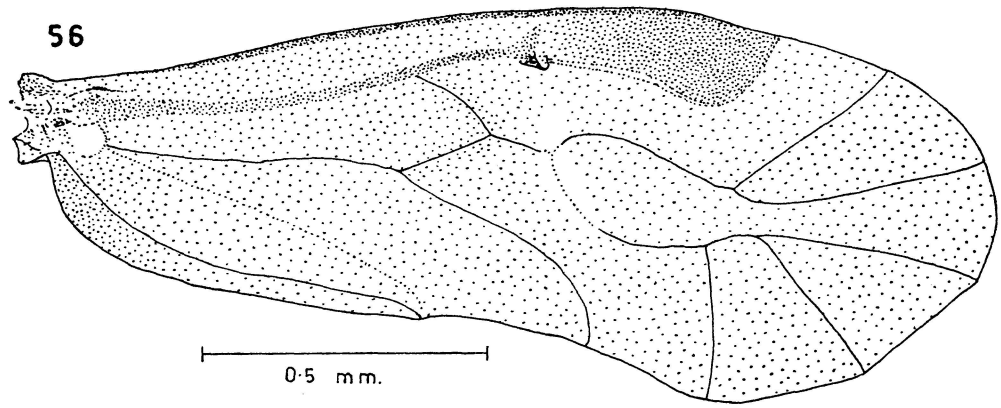
♂. *Coloration* (after 1 yr in alcohol): Vertex cream, usual pattern light grayish brown, spots coalescing. Sagittal suture dark brown. Clypeus with faint indistinct lighter brown oblique striae. Anteclypeus light brown basally, almost colorless apically. Labrum brown. Gena cream. Maxillary palp cream basally, grading to light brown apically. Antenna uniformly light brown. Ocelli pale on dark brown protuberance. Eyes black. Mesothoracic terga light brown, no cream spot; suture distinct, brown in parts. Metathoracic terga similar. Thoracic pleura light brown. Leg: basal segments almost white, tibia and tarsal segments light brown. Fore wing (fig. 59) basal 1/6 light brown; a large, rounded, light brown spot basal to pterostigma, extending from anterior margin to posterior margin, bordered by a wide hyaline band on either side; apical 1/4 of wing light brown, veins brown in pigmented areas, lighter in hyaline areas. Hind wing hyaline with costal cell pale brown, a rounded pale brown spot at center basal to *rs-m* junction, and apical 1/4 of wing pale brown; veins brown in pigmented areas, lighter in hyaline areas. Abdomen cream with wide pale brown bands dorsally and laterally. Apical segment light brown.

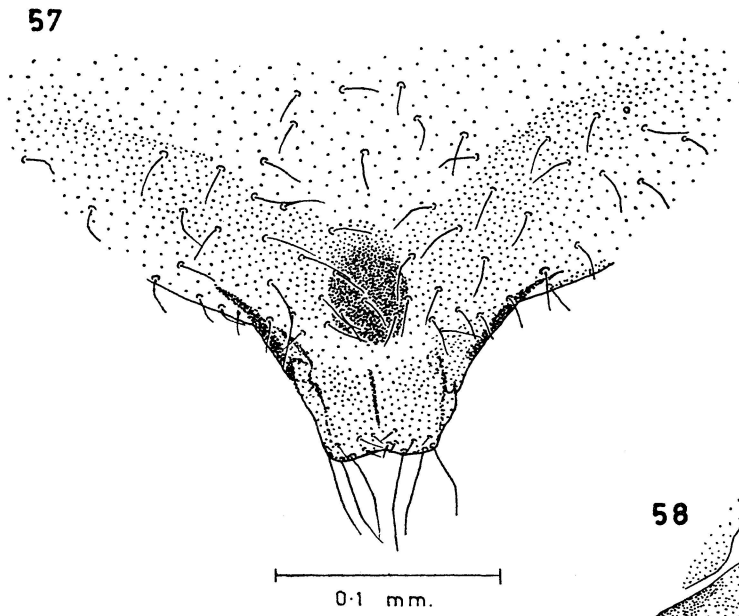
Morphology: Pterostigma of fore wing finely granulate, apex smoothly rounded. Subgenital plate (fig. 60): median apical lobe subrectangular, notched at center of apical margin, with fine setae in apical 1/4; sclerotization in apical lobe peripheral, wider at apical margin; in main plate wide V-shaped area of sclerotization, a median pair of rounded, much more strongly sclerotized spots anterior to base of lobe; setae on main plate fine, denser along posterior margin but not extending into base of apical lobe, isolated setae sparse. Gonapophyses (fig. 61): ventral valve with subapical field of fine short spinelets, constricting to a fine styliform apex beset with fairly long recurrent spines; dorsal valve with subapical row of setae, basally with prominent fold at outer margin; outer valve very small with a few setae. Metric and meristic characters as in Table 5.

♂. Unknown.

DISTRIBUTION: Malaya.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7946) (tube L88.2, slides L88.2a, b), near Simpang





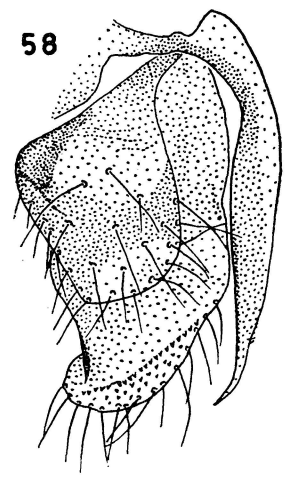


Fig. 56-58. *Peripsocus stigmatus* ♀: 56, fore wing; 57, subgenital plate; 58, gonapophyses. (57, 58 to common scale.)

Pulai, Ipoh, Malaya, 29.VII.1963, Lee.

P. valvulus has a fore wing pattern similar to that of *P. reicherti* End. (Malaya, Indonesia, Seychelles), *P. quadripunctatus* Bad. (Angola) and *P. brachyura* (Palawan). It differs from them in having the pigmentation of the fore wing patches of equal intensity, in that the hind wing is brown apically, and in genitalic characters.

Ectopsocopsis cryptomeriae Enderlein

See p. 26.

Ectopsocopsis cognatus Thornton and Wong, new species

♀. *Coloration* (after 3 yr in alcohol): Vertex light reddish brown, usual pattern darker grayish brown. Sagittal suture dark brown. Frons light reddish brown. Clypeus with indistinct striae. Anteclypeus cream. Labrum brown. Gena light reddish brown with a large grayish brown spot dorsally. Longer setae on head dark reddish brown. Maxillary palp brown, white at joints. Antenna brown. Ocelli pale, inner margin reddish brown. Eyes black. Mesothoracic terga light reddish brown, a small cream spot at center of notum and at anterior corners of antenotum; suture indistinct. Metathoracic terga similar. Thoracic pleura light reddish brown. Leg: coxa light reddish brown, trochanter and femur cream, tibia and tarsal segments light brown. Fore wing (fig. 62) uniformly very light brown, slightly darker along tip of m_2, m_3, and cu_1; origin of m_2 and m_3 hyaline. Hind wing very light brown; veins brown. Abdomen cream, with diffused reddish brown pigmentation laterally.

Morphology: Longer setae on head long, sparse. Ocelli far apart. Marginal setae of fore wing (fig. 62) very fine, short, extra row from *sc* to r_{4+5}; pterostigma granulate, broadest basally, veins *rs* and *m* fuse for a short length; setae on veins short, fairly thick and fairly dense. Hind wing bare. Subgenital plate (fig. 63) with a small membranous median apical lobe projecting beyond a pair of strongly sclerotized internal lobes. Sclerotization on main plate vague, V-shaped, on lining as a number of folds. Setae uniform on main plate, absent on apical lobe. Gonapophyses (fig. 64) ventral and dorsal valve absent; outer valve flap-like, with 4 setae. Gonopore plate large with scale-like sclerotization. Paraproct with a median transverse row of 5 long setae, and a large spine on mesial face. Metric and meristic characters as in Table 6.

♂. Unknown

DISTRIBUTION: Malaya.

Table 6. Metric (in mm) and meristic characters of *Ectopsocopsis cognatus* (♀) and *Ectopsocus amphithrix* (♀), *E. baliosus* (♂), *E. cirratus* (♂), and *E. innotatus* (♀).

	E. cognatus (♀)	*E. amphithrix* (♀)			*E. baliosus* (♂)	*E. cirratus* (♂)	*E. innotatus* (♀)
B	1.94	1.42	1.62	1.54	–	–	–
A	1.180	–	0.915	0.915	–	0.930	0.795
f_1	0.220	0.160	0.170	0.160	0.200	0.170	0.140
f_2	0.130	0.105	0.100	0.095	0.120	0.105	0.075
Ratio f_1/f_2	1.69	1.54	1.73	1.72	1.67	1.83	1.81
Ratio I. O.: D.	3.75	3.84	4.00	3.84	2.10	3.67	3.00
Fw	1.62	1.26	1.30	1.24	1.22	1.18	1.16
Hw	1.28	0.98	1.06	1.02	1.00	0.98	0.88
Hf	0.385	0.290	0.290	0.280	0.280	0.280	0.265
Ht	0.615	0.470	0.490	0.465	0.470	0.465	0.435
t_1	0.200	0.160	0.170	0.165	0.200	0.170	0.150
t_2	0.085	0.075	0.075	0.075	0.080	0.080	0.070
Ratio t_1/t_2	2.31	2.18	2.30	2.28	2.50	2.16	2.30
Ct	9	13	14	14	16	15	13
Tr	8	8	8	8	8	8	8

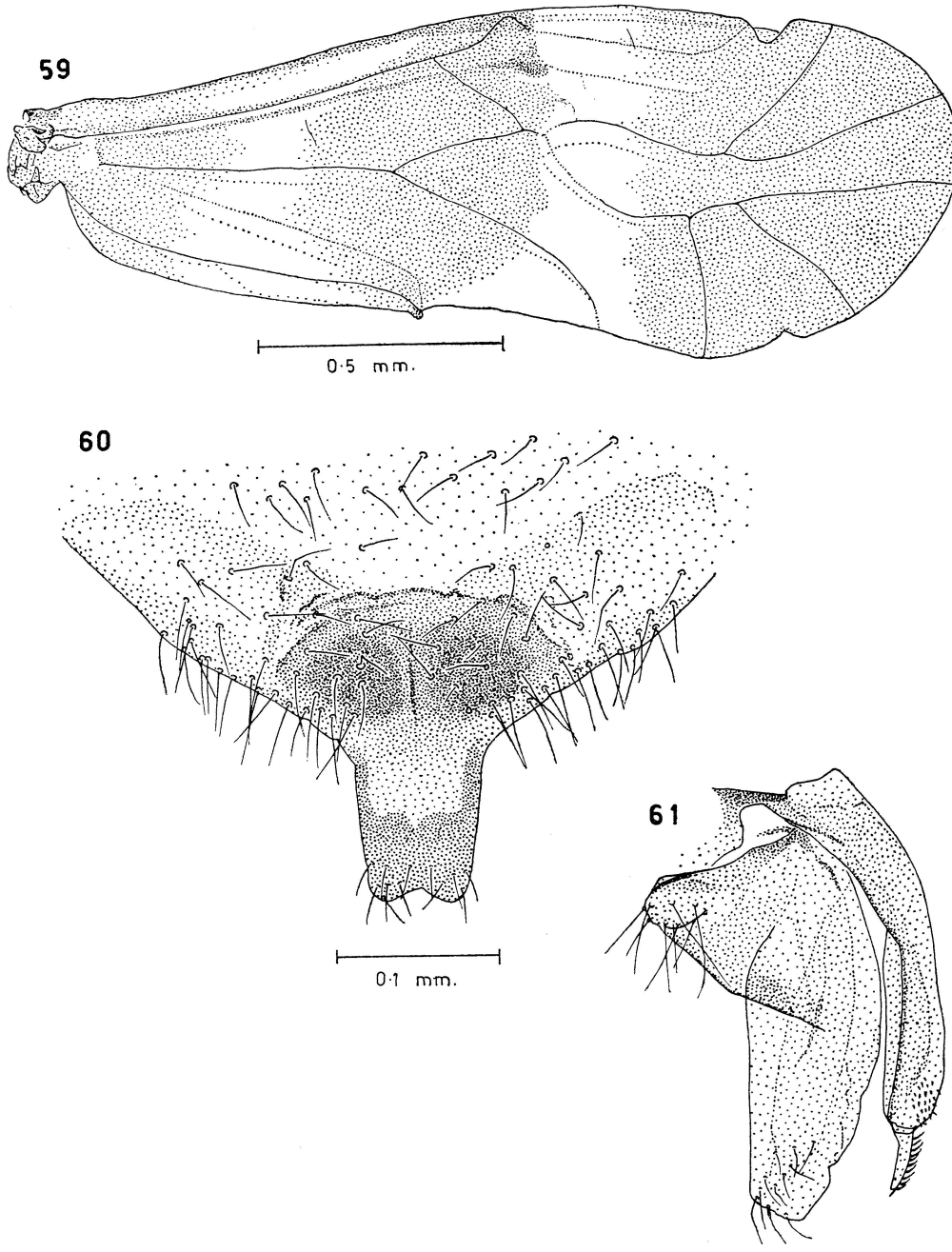


Fig. 59-61. *Peripsocus valvulus* ♀: 59, fore wing; 60, subgenital plate; 61, gonapophyses. (60, 61 to common scale.)

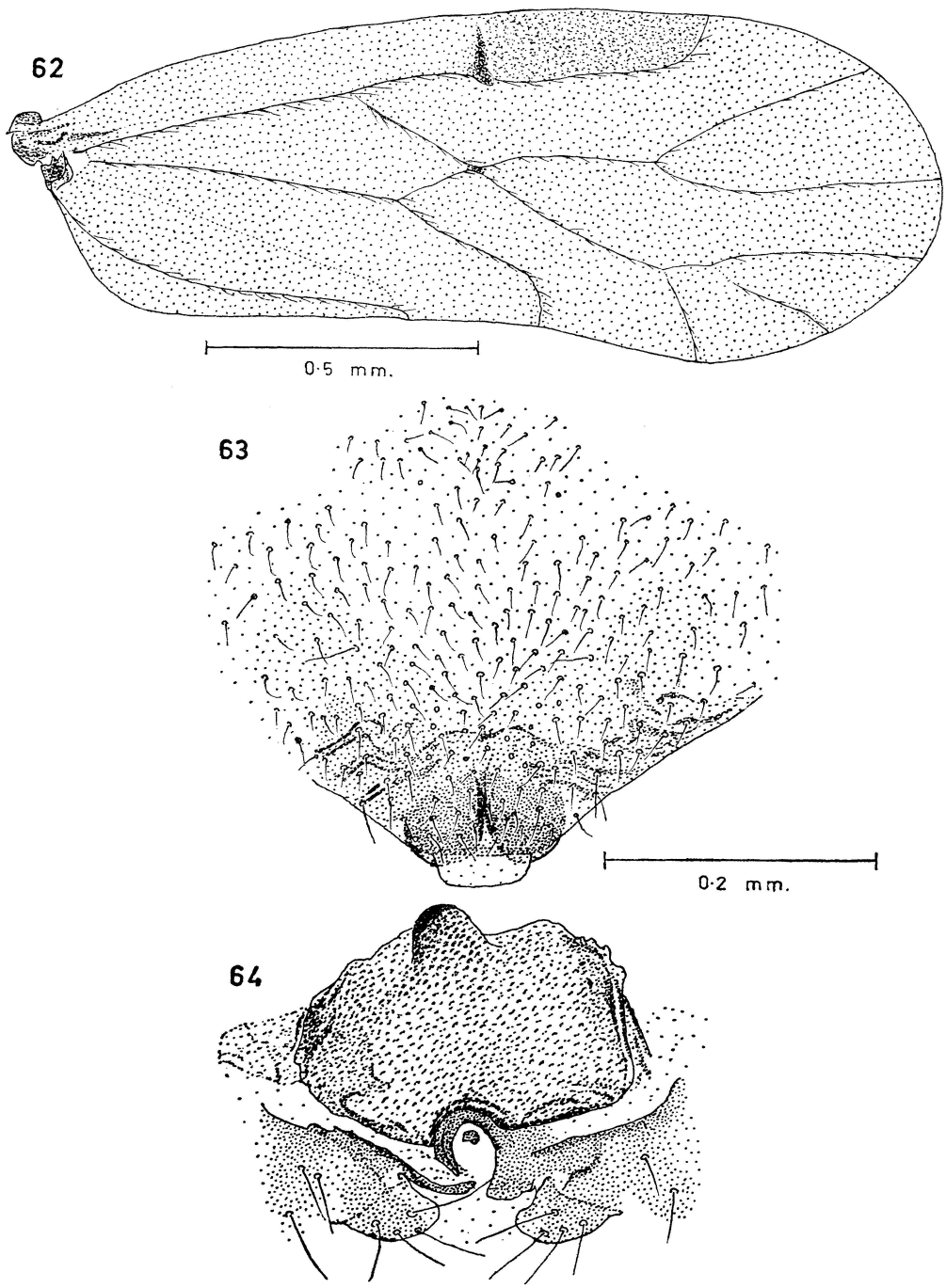


Fig. 62-64. *Ectopsocopsis cognatus* ♀: 62, fore wing; 63, subgenital plate; 64, gonapophyses. (63, 64 to common scale.)

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7947) (tube L39.1, slides L39.1a, b), near Simpang Pulai, Ipoh, Malaya, on dead vegetation, 29.VII.1963, Lee.

This species is similar in genitalic characters to *E. mozambicus* (Bad.) (Mozambique) but differs in that the internal lobes of the subgenital plate are symmetrical and do not protrude laterally, and the outer valve of the gonapophyses is shorter.

Ectopsocus cinctus Thornton

See p. 13.

Ectopsocus maindroni Badonnel

See p. 13.

Ectopsocus amphithrix Thornton and Wong, new species

♀. *Coloration* (after 3 yr in alcohol): Head brown, with an oblique darker brown mark from mesial margin of orbit to posterior margin of vertex. Sagittal suture dark brown. Clypeus with slightly darker indistinct striae. Anteclypeus pale. Gena darker brown near orbit. Maxillary palp light brown, apical segment white apically. Antenna light brown. Ocelli pale, on dark brown protuberance. Eyes black. Thorax brown, sutures dark brown. Leg: brown, except coxa and trochanter pale. Fore wing light brown, darker along m_3 and cu_1; veins brown. Hind wing light brown; veins brown. Abdomen light buff with diffuse pigmentation laterally.

Morphology: Fore wing (fig. 65) marginal setae short, extra row from *sc* to r_{4+5}; setae on veins fairly long, sparse; pterostigma broader basally, apex smoothly rounded; veins *rs* and *m* meet at a point, fuse for a short length or are united by a very short cross-vein. Hind wing with 4 short marginal setae between *r* fork. Subgenital plate (fig. 66) apical lobes constricting subapically, mesial margins parallel; each with 2 short stout and 1 fine seta on lateral margin; sclerotization weak, along mesial margin of lobe. Sclerotization on main plate as 2 ovoid areas, and in lining as 2 subapical lateral ovoid patches the right one of which is more heavily sclerotized, a lighter area between these. A row of 4 (not 6) long subapical setae on main plate. Gonapophyses (fig. 67): ventral valve narrow, apex tapering; outer valve fairly uniform in width, with an apical field of 5 setae. Paraproct with a median transverse row of 4 long setae, and a large single spine on mesial face. Metric and meristic characters as in Table 6.

♂. Unknown.

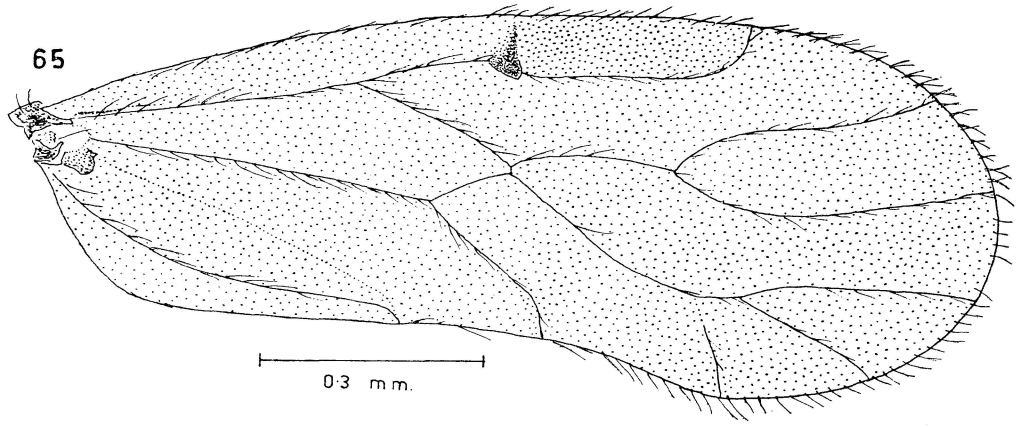
DISTRIBUTION: Malaya.

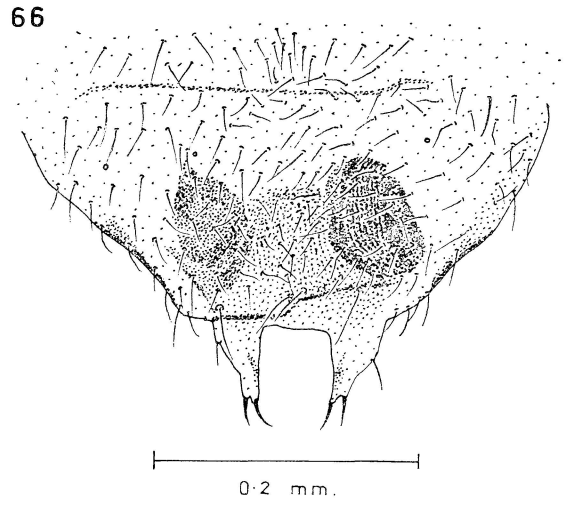
MATERIAL EXAMINED: Holotype ♀ (BISHOP 7948) (tube L73.9, slide 73.9a, b), near Simpang Pulai, 29.VII.1963, Lee; paratypes 2 ♀♀, same data as holotype.

E. amphithrix has a fore wing pattern and female gonapophyses of the *maindroni* type. It can be distinguished from other members of the group by the shape of the apical lobes of the subgenital plate, and the peculiar form of sclerotization on the lining of the subgenital plate.

Ectopsocus baliosus Thornton and Wong new species,

♂. *Coloration* (after 4 yr in alcohol): Vertex brown with a pale X-shaped area radiating from ocelli. Sagittal suture dark brown; frontal suture brown, bordered brown. Frons pale. Clypeus brown, striae indiscernible. Anteclypeus pale. Labrum dark brown. Gena pale, posterior margin brown. Maxillary palp lost. Antenna: scape brown, pedicel and 2 basal flagellar segments light brown, rest of flagellum darkening to brown. Ocelli pale, on dark brown protuberance. Eyes black. Mesothorax: a longitudinal buff line along mid-line; antedorsum brown, posterior margin buff; dorsal lobes brown, posterior margin buff, scutellum dark brown; sutures indistinct. Metathorax lost. Thoracic pleura brown. Leg: coxa brown, trochanter cream, femur brown, cream at apical joint, tibia and tarsal segments light brown. Fore wing (fig. 68) hyaline, costal cell, basal 1/3 of pterostigma, anal cell, and wing base light brown; brown patches in apical 2/3 of pterostigma, subapically in cells *R*, Cu_1, and Cu_2; in middle of cells R_1, R_5, and *An*; basally in cell R_3; and horse-shoe-shaped brown marking at margins of marginal cells; darker at vein apices; veins brown except cu_2 and *an* hyaline, bordered pale except near *rs-m* junction and at vein apices. Hind wing almost hyaline; veins brown except cu_2 and *an*. Abdomen color not discernible.





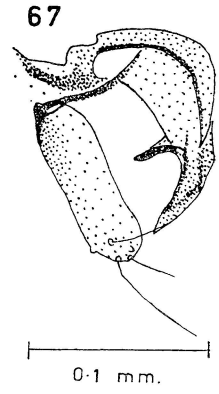


Fig. 65-67. *Ectopsocus amphithrix* ♀: 65, fore wing; 66, subgenital plate; 67, gonapophyses.

Morphology: Fore wing (fig. 68) marginal setae fairly long, extra row from *sc* to r_{4+5}; setae on veins sparse; veins *rs* and *m* united by a very short cross-vein; *r* fork narrow; pterostigma broader apically. Hind wing bare, r_{2+3} recurved. Hypandrium (fig. 69) simple. Penis frame (fig. 70) inner parameres not sclerotized; outer parameres sclerotized laterally; radula complex uninterpretable. Tergite 9 (fig. 71) broad, with a straight apical comb of 42 long slender teeth. Metric and meristic characters as in Table 6.

♀. Unknown.

DISTRIBUTION: Malaya.

MATERIAL EXAMINED: Holotype ♂ (BISHOP 7949) (tube Ma1.1, slide Ma1.1a, b), I. M. R. grazing ground, Kuala Lumpur, Malaya, light trap, 1.VI.1962.

E. baliosus has a distinctive wing pattern among *Ectopsocus* species. Tergite 9 of the male geni-

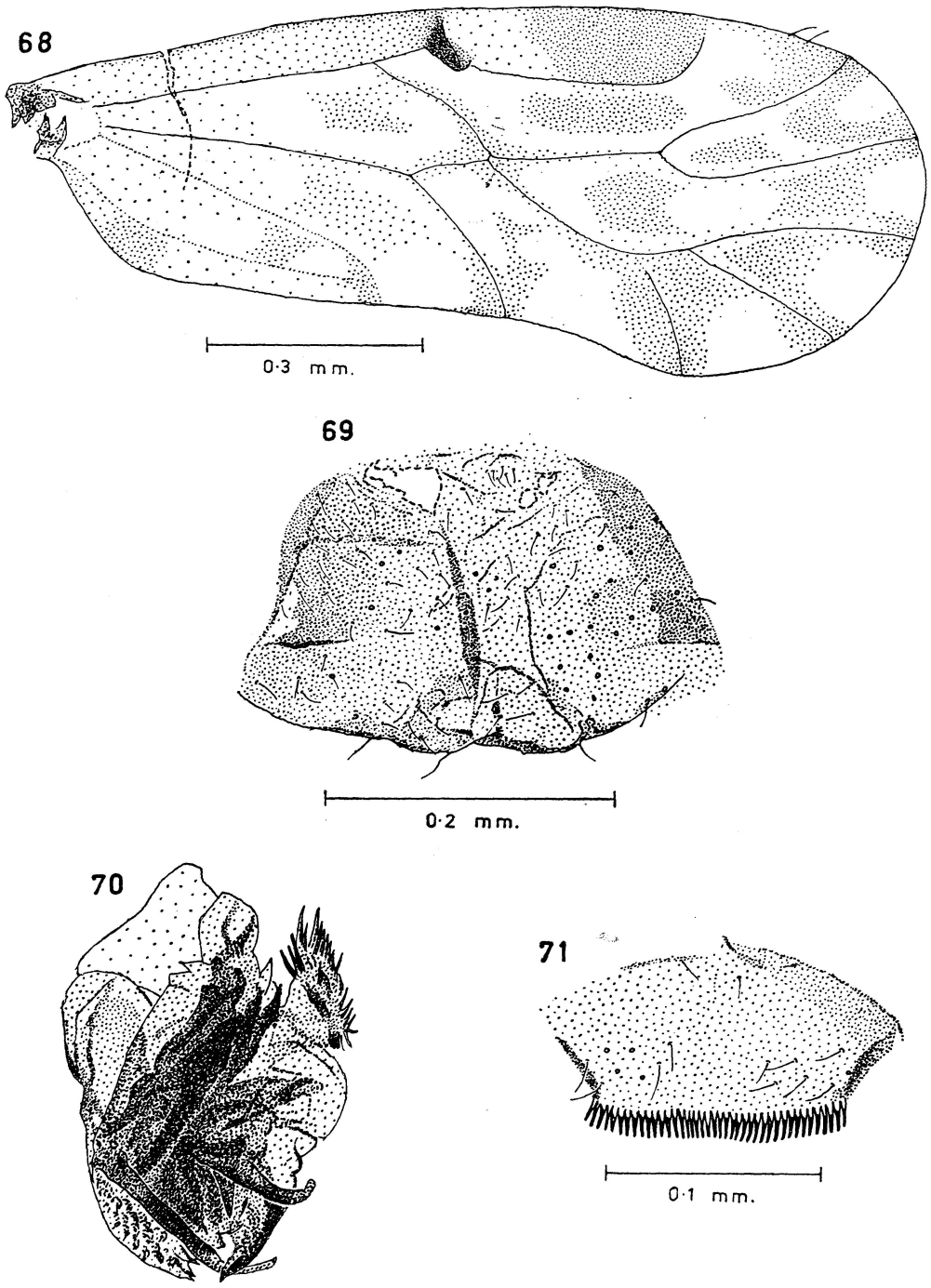


Fig. 68-71. *Ectopsocus baliosus* ♂: 68, fore wing; 69, hypandrium; 70, penis frame; 71, apical abdominal tergite. (70, 71 to common scale.)

talia is of a type common to both the *perkinsi* and *basalis* groups. It is unfortunate that the radula complex of the penis frame of the only male is uninterpretable and that no female was found; its placement in a group is thus provisional although its recurved r_{2+3} in the hind wing is characteristic of the *basalis* group.

Ectopsocus cirratus Thornton and Wong, new species

♂. *Coloration* (after 3 yr in alcohol): Head brown, markings indiscernible. Maxillary palp brown. Antenna brown. Thorax brown, markings indiscernible. Leg: brown except trochanter pale. Fore wing (fig. 72) light brown, darker along m_3 and cu_1; veins brown. Hind wing light brown; veins brown.

Morphology: Fore wing (fig. 72) narrow, marginal setae short, extra row from *sc* to m_1; setae on veins short, sparse; pterostigma apex smoothly rounded; veins *rs* and *m* meet at a point. Hind wing with 3 short marginal setae between *r* fork. Hypandrium (fig. 73) simple, setae very fine, short. Penis frame (fig. 74) tubular, radula complex not interpretable.

Tergite 9 (fig. 75) with a subapical row of 12 teeth on 1 side and 11 on the other; 2 large groups of small spines anteriorly; a heavily sclerotized C-shaped mark on either side opening laterally anterior to subapical comb, and continuing more weakly along mid line posteriorly. Metric and meristic characters as in Table 6.

♀. Unknown.

DISTRIBUTION. Malaya.

MATERIAL EXAMINED: Holotype ♂ (BISHOP 7950) (tube L15.4, slides L15.4a, b), Kuala Lumpur, on dead vegetation, 17.VII.1963, Lee.

The fore wing pattern, tubular penis frame, and tergite 9 comb row of this species resemble those of *E. maindroni* Bad. (widespread). It can readily be distinguished from *E. maindroni* by the absence of apical projections on the hypandrium, the subapical position of the comb row, and the pattern of sclerotization on tergite 9. The penis frame does not correspond in detail to that of *E. maindroni*.

Ectopsocus crinitus Thornton and Wong, new species

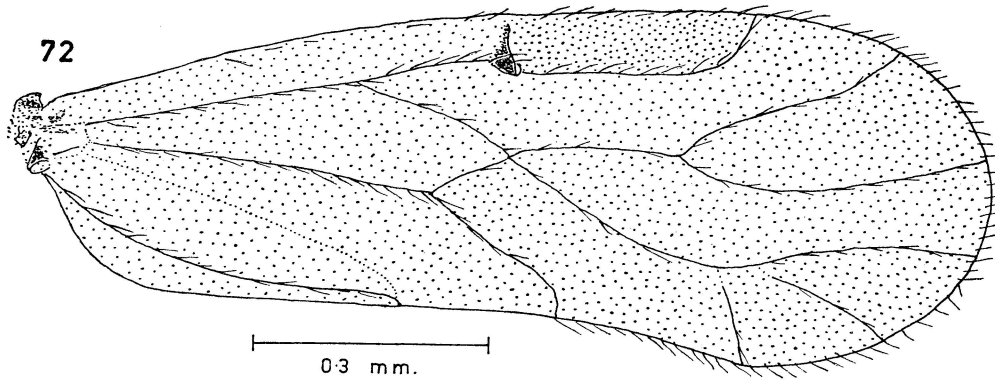
♀. *Coloration* (after 3 yr in alcohol): Head buff, markings hardly discernible, even on clypeus. Maxillary palp light brown, darker in apical segment, white at joints and at extreme apex. Antenna light brown, fading towards apex. Ocelli pale. Eyes black. Thorax buff, sutures indistinct. Leg: light brown, except trochanter and femur lighter. Fore wing (fig. 76) very light brown, slightly darker along apex of m_2, m_3 and cu_1; veins light brown. Hind wing lighter. Abdomen light buff.

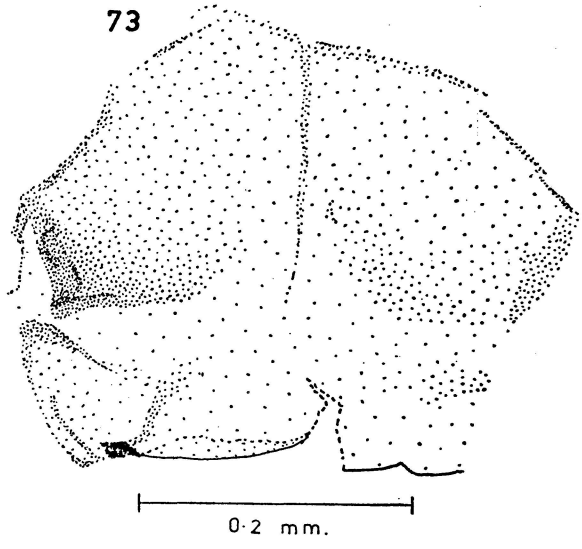
Morphology: Setae on head fairly stout, sparse. Femur broad. Fore wing (fig. 76) marginal setae fairly long, extra row between *r* fork. Setae on veins long, sparse. Pterostigma broader basally, granulation fine; veins *rs* and *m* meet at a point, fuse for a short length or are united by a short cross-vein; *r* fork wide, about 2× as long as stem; *m* displaced towards posterior margin. Hind wing (fig. 77) with 9–11 (10 specimens) long marginal setae between *r* fork; *rs* and *m* fuse for a certain length. Subgenital plate (fig. 78) apical lobe short, not well marked from main plate, apex indented, with 3 stout and 1 finer setae on each side; rounded area of sclerotization at anterior corners. Sclerotization of main plate as 2 large ovoid areas, on lining as a large sheet with posterior wave-like folds. Gonapophyses (fig. 79): ventral valve very broad and rounded basally with a group of flattened, pointed, overlapping scale-like spines, tapering to a point apically; outer valve small, narrow basally, with 6–7 (5 specimens) fine setae on apical and outer margin. Paraproct with a median transverse row of 3 long setae, and a double spine with unequal members on mesial face. Metric and meristic characters as in Table 7.

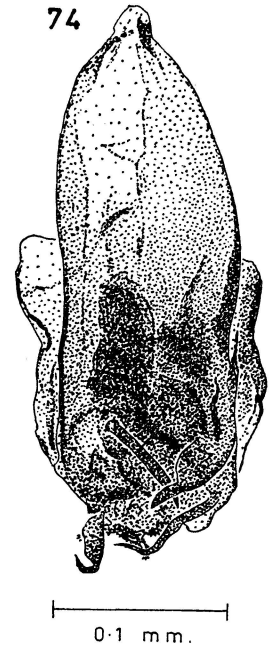
♂. *Coloration* (after 3 yr in alcohol): As ♀.

Morphology: Hypandrium (fig. 80) apex with lateral hooks; sclerotization as oblique lines from hooks; setae long. Penis frame (fig. 81) inner parameres fused to a broad plate with 2 lateral prongs directed posteriorly and curving laterally; 2 of the 3 radula sclerites pointed; outer parameres strongly sclerotized. Tergite 9 (fig. 82) longer than broad, with an apical row and an irregular subapical band of small tubercles; sclerotization lateral and anterior. Metric and meristic characters as in Table 7.

DISTRIBUTION: Malaya.







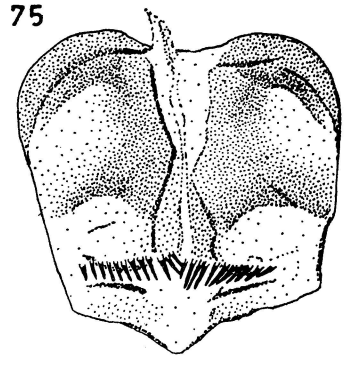


Fig. 72-75. *Ectopsocus cirratus* ♂: 72, fore wing; 73, hypandrium; 74, penis frame; 75, apical abdominal tergite. (74, 75 to common scale.)

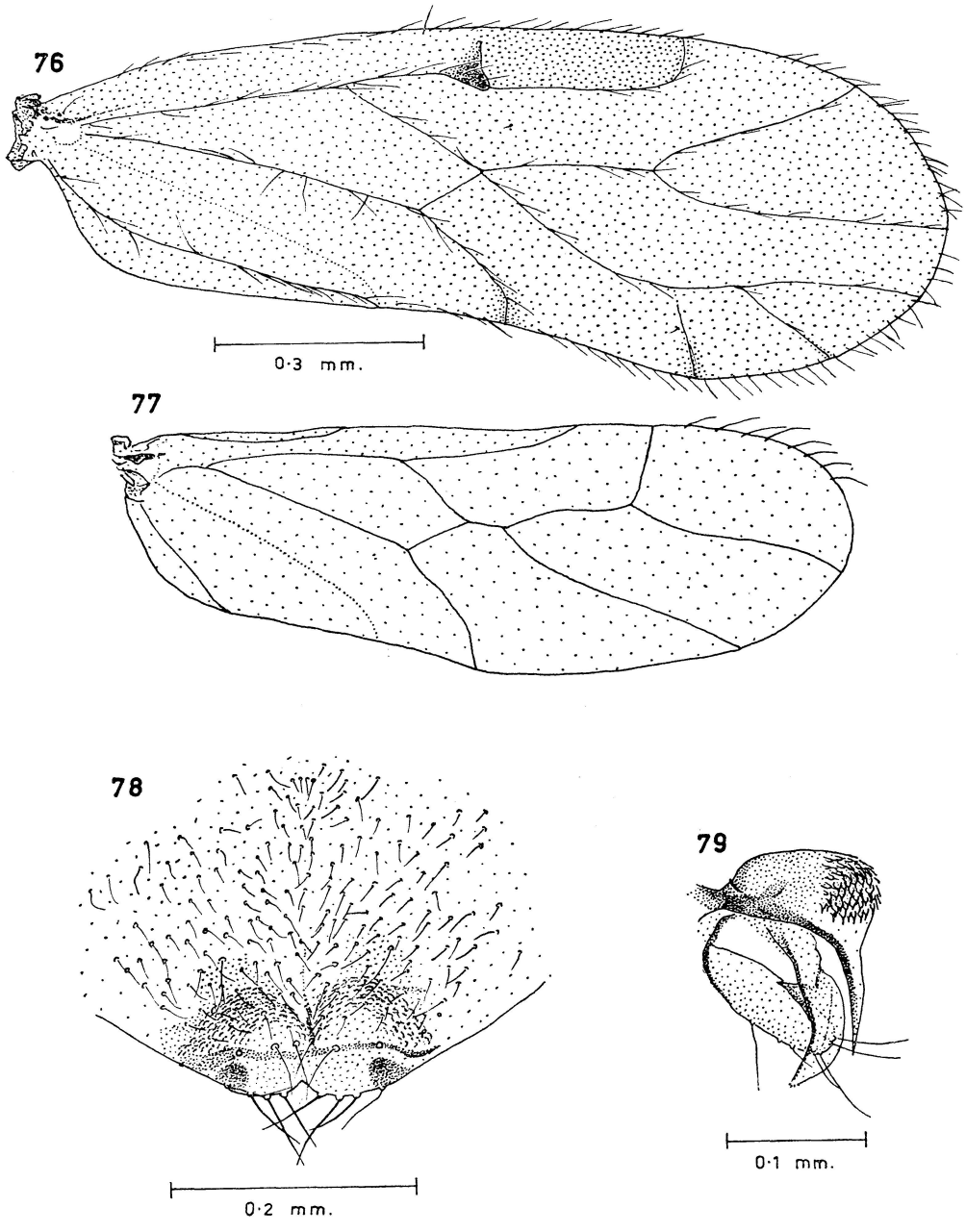


Fig. 76-79. *Ectopsocus crinitus:* 76, ♂ fore wing; 77, ♂ hind wing; 78, subgenital plate; 79, gonapophyses. (76, 77 to common scale.)

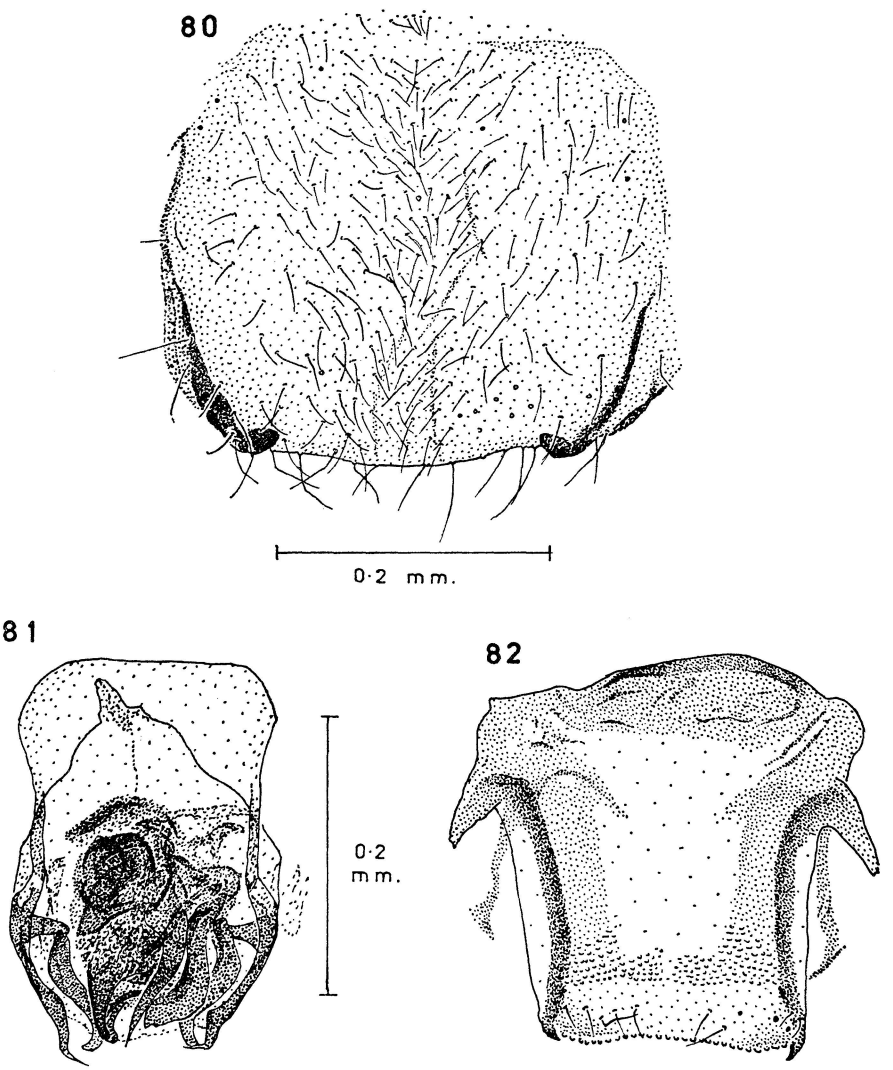


Fig. 80-82. *Ectopsocus crinitus:* 80, hypandrium; 81, penis frame; 82, ♂ apical abdominal tergite. (81, 82 to common scale.)

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7951) (tube L73.1, slides L73.1a, b), near Simpang Pulai, Ipoh, Malaya, on dead vegetation, 29.VII.1963, Lee; allotype ♂, (tube L73.8, slides L73.8a, b), same collecting data; paratypes 10 ♀♀, 12 ♂♂, same collecting data as holotype and allotype; 9 ♀♀, 3 ♂♂, Kuala Lumpur, on dead vegetation, 17.VII.1963, Lee.

In ciliation of the fore wing *E. crinitus* approaches the *hirsutus* group, but the setae are finer, and the distribution of hind wing setae does not extend to r_1. In the hind wing the *rs-m* junction of *E. crinitus* is unique in being fused for a length in all specimens (35) examined, a departure from the usual condition of *Ectopsocus*. Its genitalic characters approach those of *E. pilosus* Bad. (India, Cambodia, Madagascar), differing in the number of apical setae on the subgenital

Table 7. Metric (in mm) and meristic characters of 5 ♀♀ and 5 ♂♂ of *Ectopsocus crinitus*.

	♀					♂				
B	1.58	1.40	1.64	1.72	1.52	1.42	–	1.62	1.46	1.48
A	1.105	1.005	0.995	–	0.955	1.045	0.980	1.015	0.985	1.000
f_1	0.195	0.190	0.180	0.185	0.185	0.195	0.190	0.190	0.180	0.190
f_2	0.100	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.100	0.100
Ratio f_1/f_2	1.97	1.81	1.77	1.80	1.80	1.85	1.86	1.81	1.84	1.93
Ratio I. O.: D.	4.55	4.00	4.17	4.00	4.80	4.37	4.37	3.67	4.00	3.83
Fw	1.32	1.30	1.32	1.32	1.32	1.32	1.32	1.30	1.30	1.30
Hw	1.08	1.08	1.10	1.10	1.08	1.06	1.12	1.08	1.04	1.08
Hf	0.290	0.300	0.300	0.300	0.280	0.285	0.285	0.285	0.280	0.280
Ht	0.490	0.495	0.495	0.490	0.490	0.485	0.485	0.475	0.470	0.470
t_1	0.160	0.160	0.170	0.160	0.145	0.160	0.160	0.150	0.160	0.145
t_2	0.080	0.075	0.075	0.075	0.075	0.075	0.080	0.075	0.075	0.065
Ratio t_1/t_2	2.00	2.07	2.24	2.07	2.00	2.07	2.00	1.98	2.18	2.20
Ct	11	11	13	12	11	11	11	14	14	13
Tr	8	8	8	8	8	7	8	8	8	8

plate apical lobes, in the hypandrium apical margin, in the structure of the penis frame and in details of the ornamentation of tergite 9.

Ectopsocus furcatus Thornton and Wong, new species

See p. 115.

Ectopsocus innotatus Thornton and Wong, new species

♀. *Coloration* (after 3 yr in alcohol): Head pale brown, markings and striae indiscernible. Maxillary palp light brown. Antenna light brown. Ocelli pale. Eyes black. Thorax buff, markings indiscernible. Leg: pale brown except trochanter and femur pale. Fore wing pale brown, darker along apices of m_3 and cu_1; veins light brown. Hind wing almost hyaline; veins light brown.

Morphology: Fore wing (fig. 83) marginal setae short, extra row from *sc* to r_{4+5}; setae on veins fairly long, sparse; pterostigma apex smoothly rounded; veins *rs* and *m* meet at a point. Hind wing with 5 fairly long marginal setae between *r* fork. Subgenital plate (fig. 84) apical lobes triangular, mesial margin concave; each with 2 stout and 1 fine setae on lateral margin; sclerotization apical. Sclerotization on main plate as 2 ovoid areas, on lining as 2 subapical median spots of equal intensity. Gonapophyses (fig. 85): ventral valve narrow; outer valve fairly uniform in width, slightly bent laterally, with a field of 5 setae in apical 1/4. Paraproct with a median transverse row of 4 long setae. Metric and meristic characters as in Table 6.

♂. Unknown.

DISTRIBUTION: Malaya.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7952) (tube L.39.30 slides 39.30a, b), near Simpang Pulai, Ipoh, Malaya, on dead vegetation, 29.VII.1963, Lee.

The chaetotaxy of the fore and hind wing of *E. innotatus* resembles that of *E. crinitus* (Malaya), the subgenital plate resembles that of *E. cinctus* Th. (India, Hong Kong, Malaya, Vietnam), and the gonapophyses resemble those of *E. maindroni* Bad. (widespread).

Ectopsocus salpinx Thornton and Wong, new species

See p. 70.

Ectopsocus tenellus Thornton and Wong, new species

♀. *Coloration* (after 3 yr in alcohol): Head brown, markings faint. Clypeus with narrow dark brown striae. Maxillary palp light brown, pale at joints. Antenna light brown. Ocelli pale, central border dark brown. Eyes black. Thorax brown. Leg: brown, femur and tibia with pale apices. Fore wing light

Table 8. Metric (in mm) and meristic characters of *Ectopsocus tenellus* (♀), *E. vannus* (♂), *E. denotatus* (♀), *Peripsocus brachyura* (♀), and of *Ectopsocus argus* (♀).

	E. tenellus (♀)	*E. vannus* (♂)		*E. denotatus* (♀)	*P. brachyura* (♀)	*E. argus* (♀)
B	1.54	–	1.18	–	1.86	–
A	0.915	1.105	0.795	–	1.160	0.795
f_1	0.160	0.130	0.125	0.250	0.200	0.135
f_2	0.095	0.095	0.085	0.145	0.130	0.080
Ratio f_1/f_2	1.72	1.43	1.46	1.73	1.55	1.70
Ratio I. O.: D.	3.50	3.64	3.56	3.92	2.70	4.00
Fw	1.18	1.14	1.08	2.00	1.74	1.14
Hw	0.96	0.94	0.86	–	1.38	0.96
Hf	0.265	0.250	0.240	–	0.310	0.265
Ht	0.440	0.450	0.410	–	0.625	0.430
t_1	0.160	0.150	0.130	–	0.160	0.145
t_2	0.075	0.075	0.075	–	0.085	0.075
Ratio t_1/t_2	2.18	2.09	1.82	–	1.85	2.00
Ct	14	13	10	–	11	11
Tr	8	8	8	6	20	8

brown, paler towards apical and posterior margin, darker along m_3 and cu_1; veins brown. Hind wing lighter; veins brown. Abdomen very light brown, with dark brown lateral band.

Morphology: Head setae long. Fore wing (fig. 86) broad, hardly broadened subapically, apex bluntly rounded; margin bare; setae on veins fairly long, sparse; pterostigma granulation fine; veins *rs* and *m* meet at a point; *r* fork wide. Hind wing bare. Subgenital plate (fig. 87) apical lobes triangular, mesial margins parallel, constricting to a fine point apically; each with 3 fine setae subapically on lateral margin; sclerotization very strong apically and at anterior corners. Sclerotization of main plate V-shaped, lining sclerotized as a large sheet, with posterior lobe. Four long subapical setae on main plate. Gonapophyses (fig. 88): ventral valve broad basally, tapering apically; outer valve straight, lateral margin subparallel, with a field of 6 setae apically. Paraproct with a median transverse row of 5 long setae, and a very small double spine with unequal members on mesial face. Metric and meristic characters as in Table 8.

♂. Unknown.

DISTRIBUTION: Malaya.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7953) (tube L112.1, slides L112.1a, b), near Simpang Pulai, Ipoh, Malaya, 29.VII.1963, Lee.

E. tenellus resembles remotely *E. cinctus* Th. (India, Hong Kong, Malaya, Vietnam) but differs in that the setae on the apical lobes of the subgenital plate are subapical and the outer valve is straight.

Ectopsocus triangulus Thornton and Wong, new species

See p. 89.

Ectopsocus vannus Thornton and Wong, new species

♂. *Coloration* (after 3 yr in alcohol): Head dark brown, usual pattern faint. Anteclypeus pale. Maxillary palp brown, pale at joints. Antenna brown, darkening towards apex, pale at joints. Ocelli pale. Eyes black. Mesothorax brown, with a buff spot at center of dorsum and buff anterior margin to dorsal lobes. Metathorax similar. Thoracic pleura brown. Leg: brown. Fore wing light brown, darker along m_2, m_3, and cu_1; veins brown. Hind wing light brown; veins light brown.

Morphology: Fore wing (fig. 89) margin bare; setae on veins short, sparse. Pterostigma apex smoothly rounded; veins *rs* and *m* united by a short cross-vein, or fuse for a short length. Hind wing bare. Hypan-

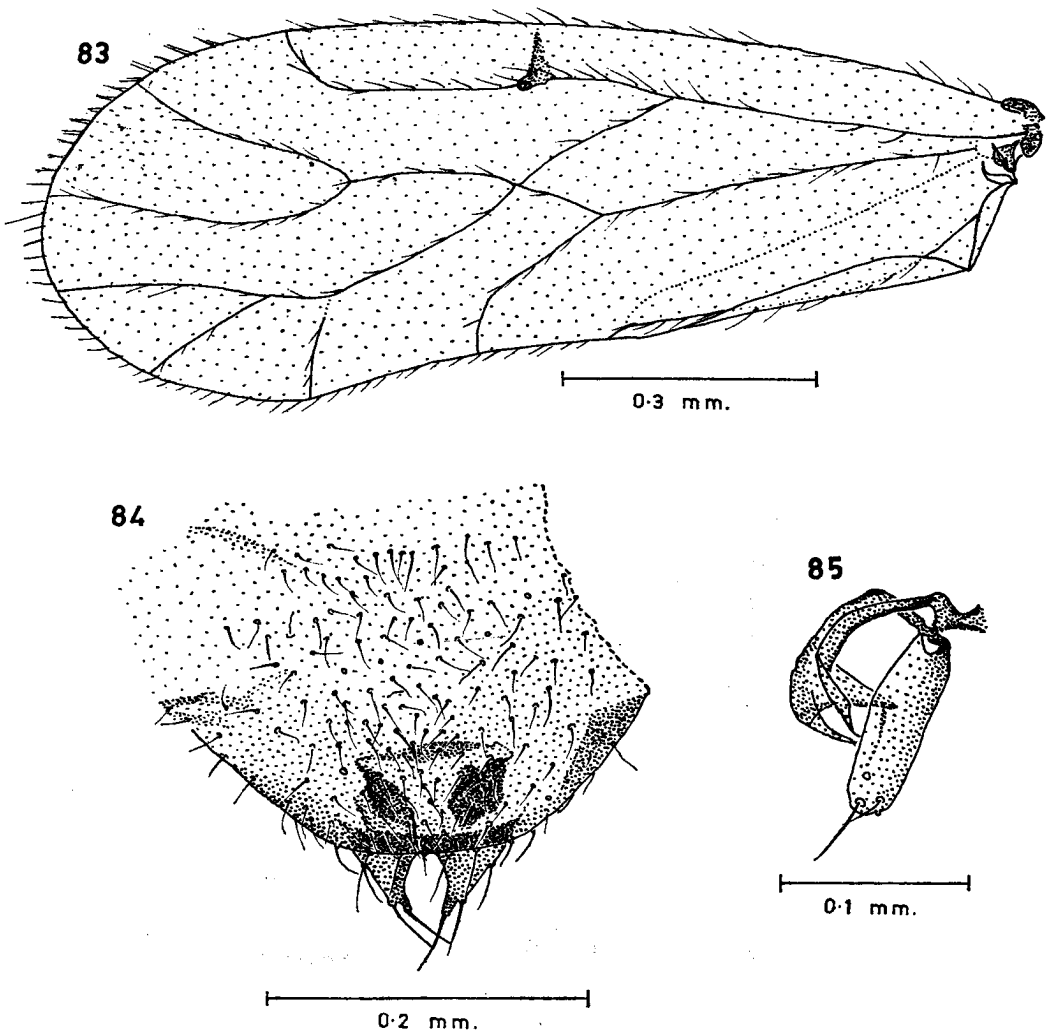


Fig. 83-85. *Ectopsocus innotatus* ♀: 83, fore wing; 84, subgenital plate; 85, gonapophyses.

drium (fig. 90) simple. Penis frame (fig. 91, 92) tubular, inner parameres fused with a median posterior fan-like knob with apical field of tubercles; 2 groups of 6 sclerites, arranged symmetrically. Tergite 9 (fig. 93) with a strongly sclerotized hat-like structure projecting anteriorly, no comb or tubercles. Metric and meristic characters as in Table 8.

♀. Unknown.

DISTRIBUTION: Malaya.

MATERIAL EXAMINED: Holotype ♂, (BISHOP 7954) (tube L31.1, slides L31.1a, b), Kuala Lumpur, Malaya, on dead vegetation, 17.VIII.1963, Lee; paratype ♂ (tube 57.1, slides L57.1a, b), near Simpang Pulai, Ipoh, 29.VII.1963, Lee.

E. vannus has a fore wing pattern common among the *maindroni* and *cinctus* groups, but has a peculiar penis frame and tergite 9 ornamentation.

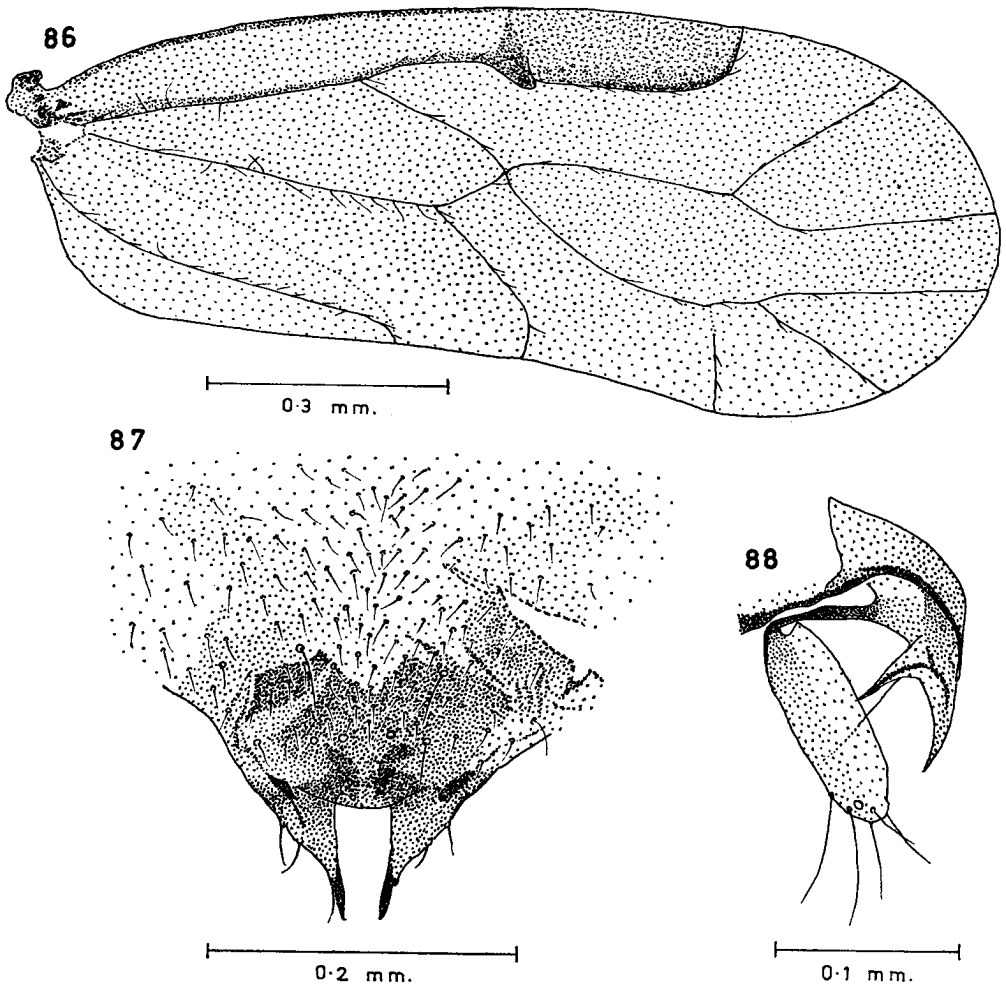


Fig. 86–88. *Ectopsocus tenellus* ♀: 86, fore wing; 87, subgenital plate; 88, gonapophyses.

Peripsocus similis Enderlein

See p. 22.

Ectopsocus pilosus Badonnel

See p. 16.

Peripsocus fulvescens Navás

Peripsocus fulvescens Navás, 1921, Bol. Soc. Ent. Esp. **4:** 93 (figure, distribution).

DISTRIBUTION: Vietnam.

Peripsocus nanus Navás

Peripsocus nanus Navás, 1922, Broteria **20:** 60 (distribution).

DISTRIBUTION: Vietnam.

Ectopsocus denotatus Thornton and Wong, new species

♀. *Coloration* (after 5 yr in alcohol): Head brown, markings indistinct. Clypeus with very faint

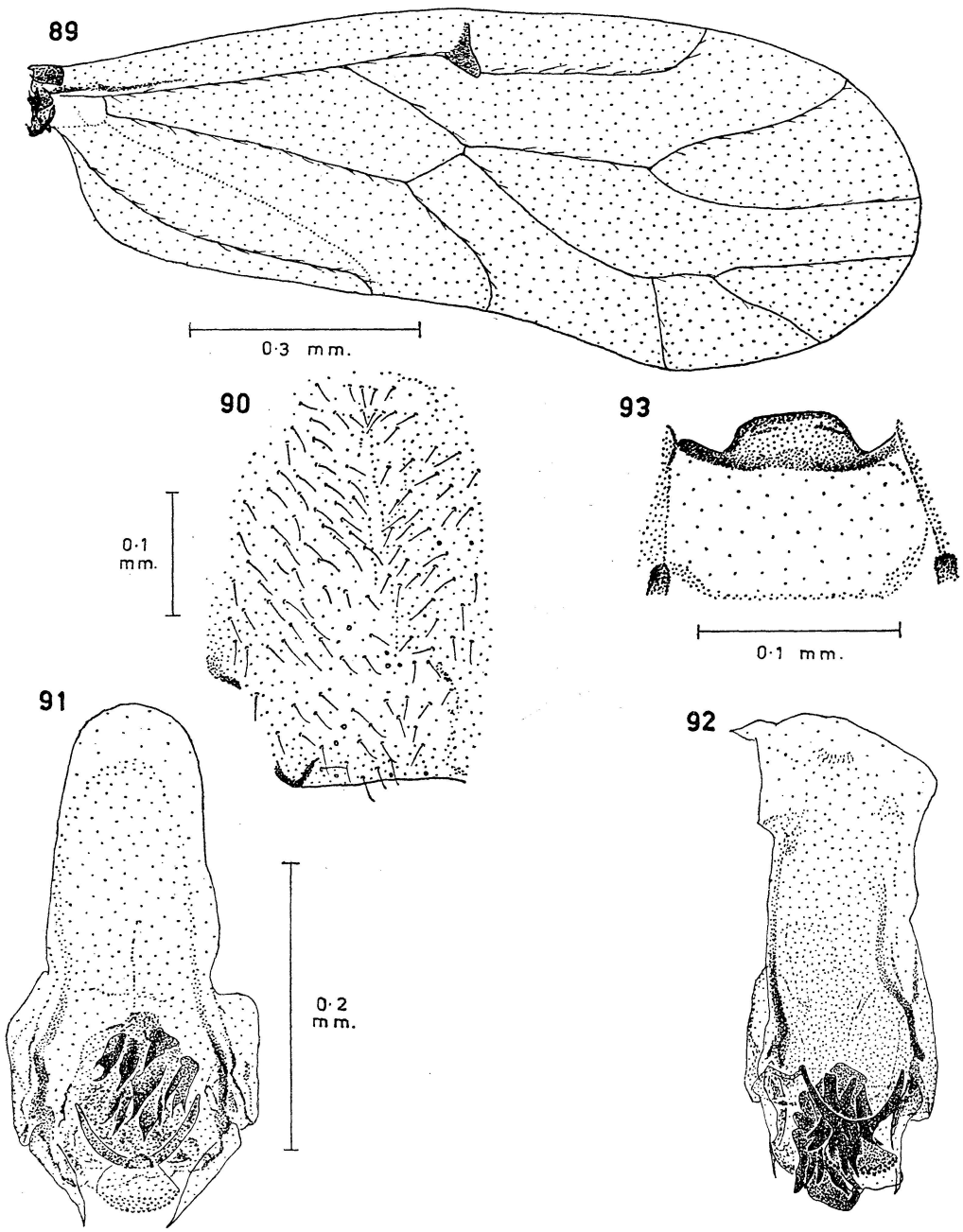


Fig. 89-93. *Ectopsocus vannus* ♂: 89, fore wing; 90, hypandrium; 91, penis frame; 92, penis frame with aedeagal sclerites on eversion; 93, apical abdominal tergite. (91, 92 to common scale.)

indistinct striae. Anteclypeus pale. Labrum dark brown. Gena brown dorsally, buff ventrally. Maxillary palp light brown, paler in apical segment, brown at apex. Antenna: scape and pedicel brown, flagellum pale. Mesothorax dark brown. Metathorax grayish brown. Leg: coxa dark brown, trochanter pale, femur brown, pale at basal joint, other segments brown. Fore wing dark brown, lighter on either side of stigmasac, at margin of cells R_1 and R_3, and along veins, hyaline key-hole marks at margins of cells M_1, M_2, M_3 and Cu_1; veins dark brown. Hind wing brown; veins dark brown. Abdomen cream with brown pigmentation more concentrated laterally.

Morphology: Fore wing (fig. 94) broad, hardly broadened subapically, margin bare; setae on veins microscopic, sparse; pterostigma broader basally, apex bluntly angulate; veins *rs* and *m* fuse for a very short length. Only basal portion of hind wing present. Subgenital plate (fig. 95) apical lobes truncate, each with 2 fine setae on mesial margin; sclerotization as an oval spot on each lobe. Sclerotization of main plate as 2 ovoid areas. A row of 12 (not 6) long subapical setae on main plate. Setae bosses conspicuous. Gonapophyses (fig. 96): ventral valve narrow; outer valve extremely broad, triangular, with a large number of setae on apical 1/2. Paraproct with no long setae in median transverse row, but with a large single spine on mesial face. Metric and meristic characters as in Table 8.

♂. Unknown.

DISTRIBUTION: Vietnam.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7955) (tube VN1.1, slides VN1.1a, b), Dalat, 20 km S, 1400 m, 14.VI.1961, N. R. Spencer.

E. denotatus has a peculiar fore wing pattern, chaetotaxy of subgenital plate and paraproct; female genitalia are also peculiar. It cannot be grouped with other known species.

Peripsocus oculatus Enderlein

Peripsocus oculatus Enderlein, 1926, Zool. Meded. **9:** 62 (nec Badonnel 1955).—Soehardjan, 1958, Idea **11**(1): 25–32.

DISTRIBUTION: Java.

Peripsocus variatus Soehardjan and Hamann

See p. 23.

Ectopsocus heurni Navás

Micropsocus heurni Navás, 1924, Broteria **21:** 140.—Soehardjan, 1958, Idea **11**(1): 25–32 (distr.)

DISTRIBUTION: Java.

Ectopsocus tinctus Navás

Ectopsocus tinctus Navás, 1924, Broteria **21:** 140.—Soehardjan, 1958, Idea **11**(1): 25–32.

DISTRIBUTION: Java.

Ectopsocus waterstradti (Enderlein)

Micropsocus waterstradti Enderlein, 1901, Zool. Jahrb Abt. Syst. **14:** 547, fig. 11, 12; 1903b, Ann. Hist. Nat. Mus. Hung. **1:** 297, fig. 19a, b (distr.); 1904, Zool. Jahrb. Abt. Syst. **20:** 105–12 (distr.).—Banks, 1942, Bull. B. P. Bishop. Mus. Honolulu **172:** 28.—Soehardjan, 1958, Idea **11**(1): 25–32.

Ectopsocus waterstradti: Enderlein, 1906a, Zool. Jahrb. Abt. Syst. **23:** 401–12 (n. comb.); 1907c, Notes Leyden Mus. **29:** 107 (distr.); 1926, Zool. Meded. **9:** 50–70.

DISTRIBUTION: Java, Borneo, New Guinea, Bismarcks, Guam.

Peripsocus ignis Okamoto

See p. 139.

Peripsocus brachyura Thornton and Wong new species,

♀. *Coloration* (after 25 days in alcohol): Vertex cream, usual pattern indistinct, light grayish brown, spots coalescing. Sagittal suture dark brown. Clypeus with faint, indistinct, oblique light brown striae. Anteclypeus brown basally, almost colorless apically. Labrum brown. Gena light brown in dorsal 1/2, cream in ventral 1/2. Maxillary palp light brown basally, darkening towards apex. Antenna light brown,

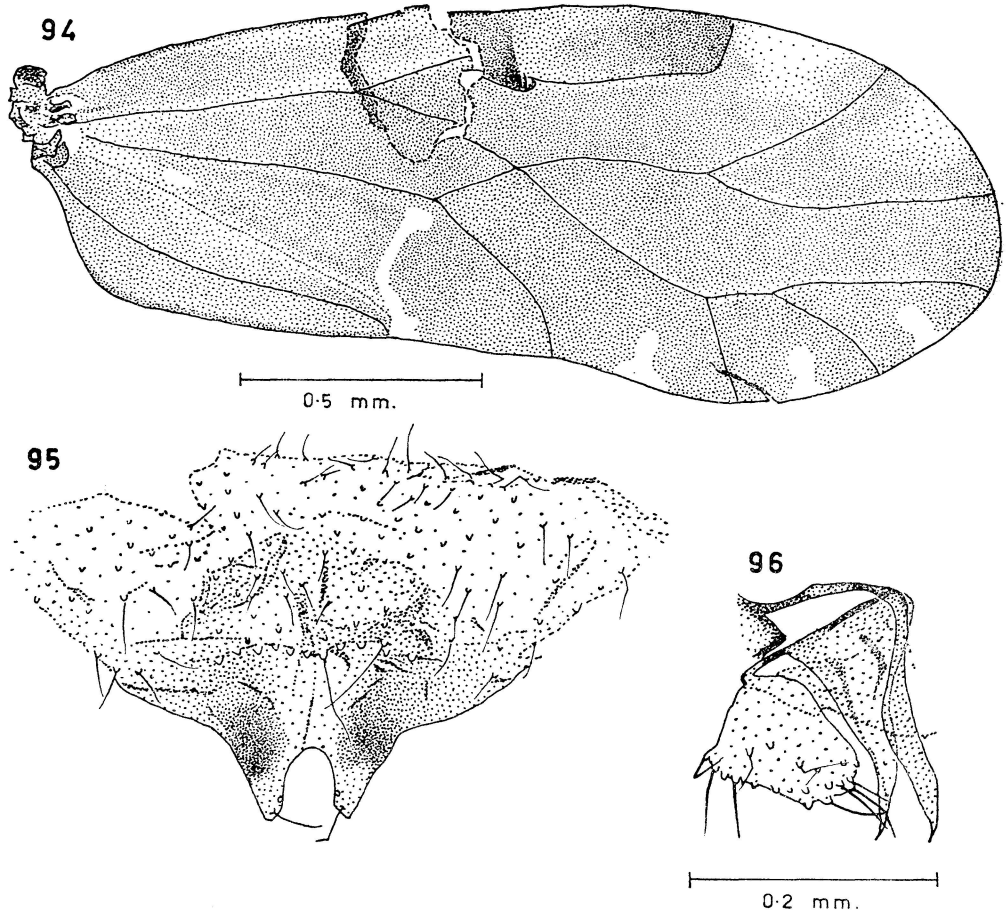


Fig. 94-96. *Ectopsocus denotatus* ♀: 94, fore wing; 95, subgenital plate; 96, gonapophyses. (95, 96 to common scale.)

flagellum slightly darkening apically. Ocelli pale on dark brown protuberance. Eyes black. Mesothoracic terga brown, a cream spot at center of notum; sutures distinct, brown in parts. Metathoracic terga similar. Thoracic pleura brown. Leg: basal segments almost white, tibia and tarsal segments brown. Fore wing (fig. 97) with basal 1/6 light brown, a large slightly darker brown round spot basal to pterostigma bounded by pale bands, apical 2/3 of wing light brown; veins brown in pigmented areas, lighter in pale areas. Hind wing almost hyaline, with costal cell light brown, apex of cell Cu_2 light brown, a large light brown median spot; veins brown in pigmented areas, lighter in pale areas. Abdomen cream, with pale brown bands dorsally and laterally. Apical segment light brown.

Morphology: Head sclerites shiny. Pterostigma of fore wing (fig. 97) granulate, its apex bluntly angulate. Subgenital plate (fig. 98): median apical lobe short, corners rounded, apical margin slightly indented; apical lobe well sclerotized, covered in apical 1/2 with short fine setae. Sclerotization of main plate V-shaped. Gonapophyses (fig. 99): ventral valve broadly styliform, tapering apically to a point, apical part beset with minute setae and fairly long recurrent spines; dorsal valve with apical field of setae and minute spinelets; outer valve small, rounded, protruding, covered with a small number of long setae. Metric and meristic

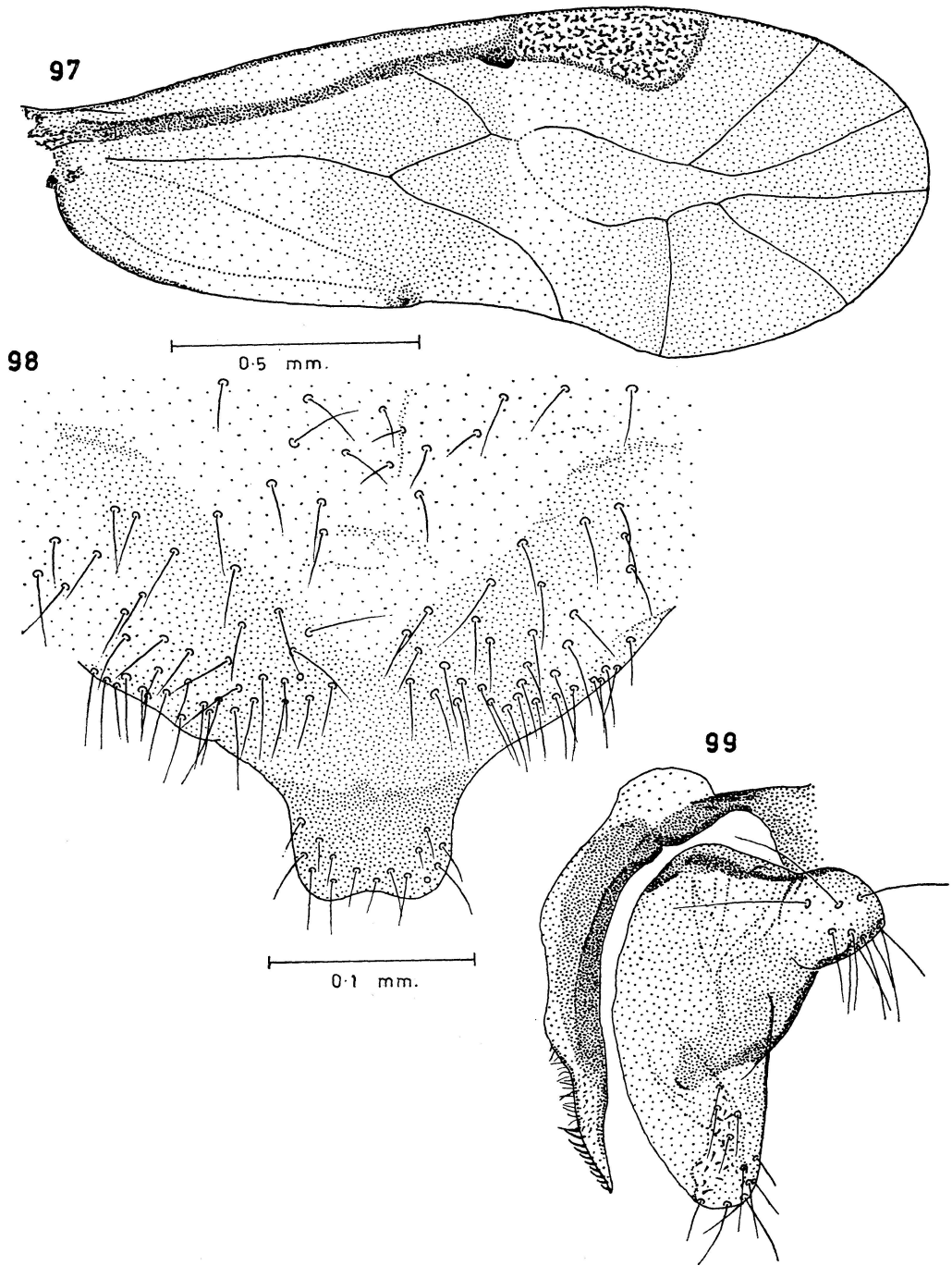


Fig. 97-99. *Peripsocus brachyura* ♀: 97, fore wing; 98, subgenital plate; 99, gonapophyses. (98, 99 to common scale.)

characters as in Table 8.

♂. Unknown.

DISTRIBUTION. Palawan.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7956) (tube PI30.1, slides PI30.1a, b), Aborlan, Palawan, coconut thatch, 17.IV.1965, Thornton; paratype 1 ♀, same collecting data.

P. brachyura is related to *P. reicherti* End. (Malaya, Indonesia, Seychelles), *P. quadripunctatus* Bad. (Angola), and *P. valvulus* (Malaya) in fore wing pattern; however, it differs from them in genitalic characters.

Ectopsocus titschacki Jentsch

Ectopsocus titschacki Jentsch, 1939, Zool. Jahrb. **73:** 120 fig. 11–14 (♀).— Ball, 1943, Bull. Mus. Hist. Nat. Belg. **19**(38): 11 (distribution).— Badonnel, 1949, Rev. Fr. Ent. **16:** 44 (♂) fig. 59–61 (distribution).— Mockford, 1965, Florida Ent. **48**(2): 114 (distribution).

The present specimen can readily be identified by the sclerotization of the apical lobe of the subgenital plate (fig. 101) and the characters of the gonapophyses (fig. 102). Its fore wing (fig.

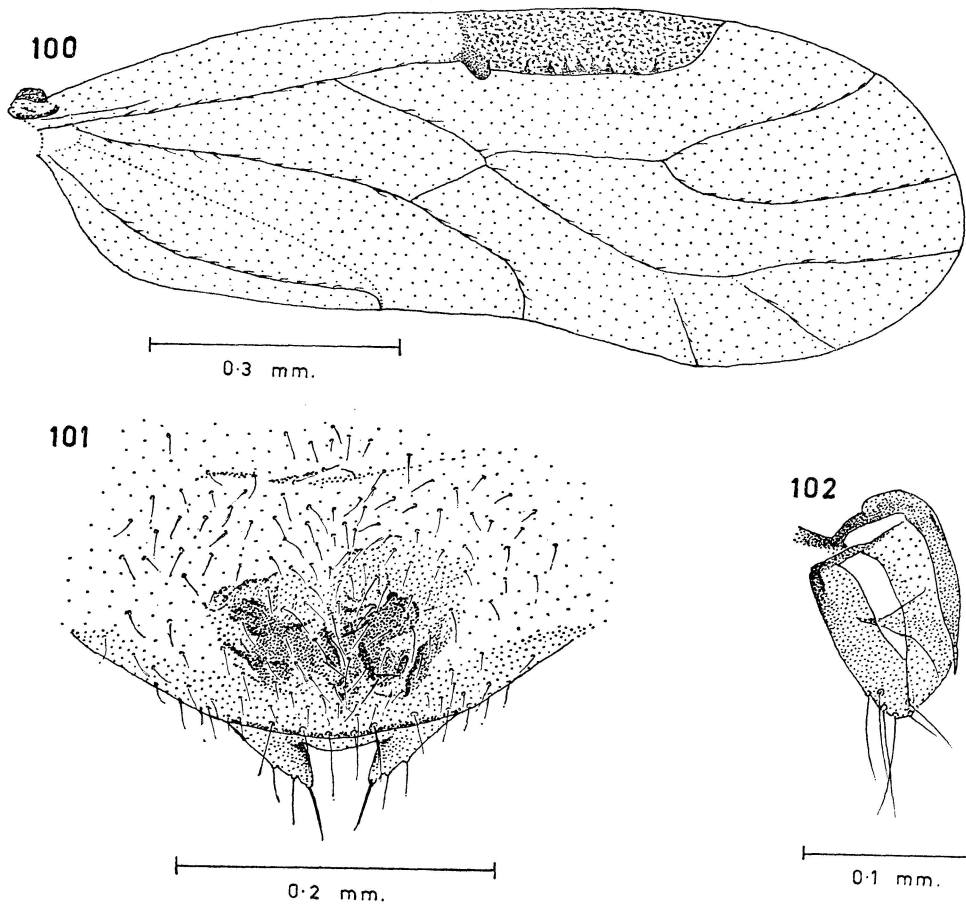


Fig. 100-102. *Ectopsocus titschacki* ♀: 100, fore wing: 101, subgenital plate; 102, gonapophyses.

100), however, has a finely granulated pterostigma, and hyaline base to veins m_2 and m_3; and its subgenital plate lining has strongly sclerotized folds appearing as a double spot not referred to in previous descriptions. This is its first record in the Oriental Region.

E. gabelensis Bad. is synonymous with *E. titschacki* (Bad. in litt.) (Mexico, Venezuela).

DISTRIBUTION: Palawan, C. & S. America, Africa (Ivory Coast, Congo), West Indies (Trinidad).

MATERIAL EXAMINED: 1 ♀, Aborlan, Palawan, 17.V.1965, Thornton.

Ectopsocus amblyura Thornton and Wong, new species

♀. *Coloration* (after 1 yr. in alcohol): Head pale buff, usual pattern very pale grayish brown. Clypeus with pale brown striae. Gena with a narrow brown band between antennal socket and orbit. Maxillary palp light brown. Antenna light brown fading towards apex. Ocelli pale. Eyes black. Thorax pale buff, a longitudinal brown band continuous with that of head. Leg: basal segments pale buff, tibia and tarsal

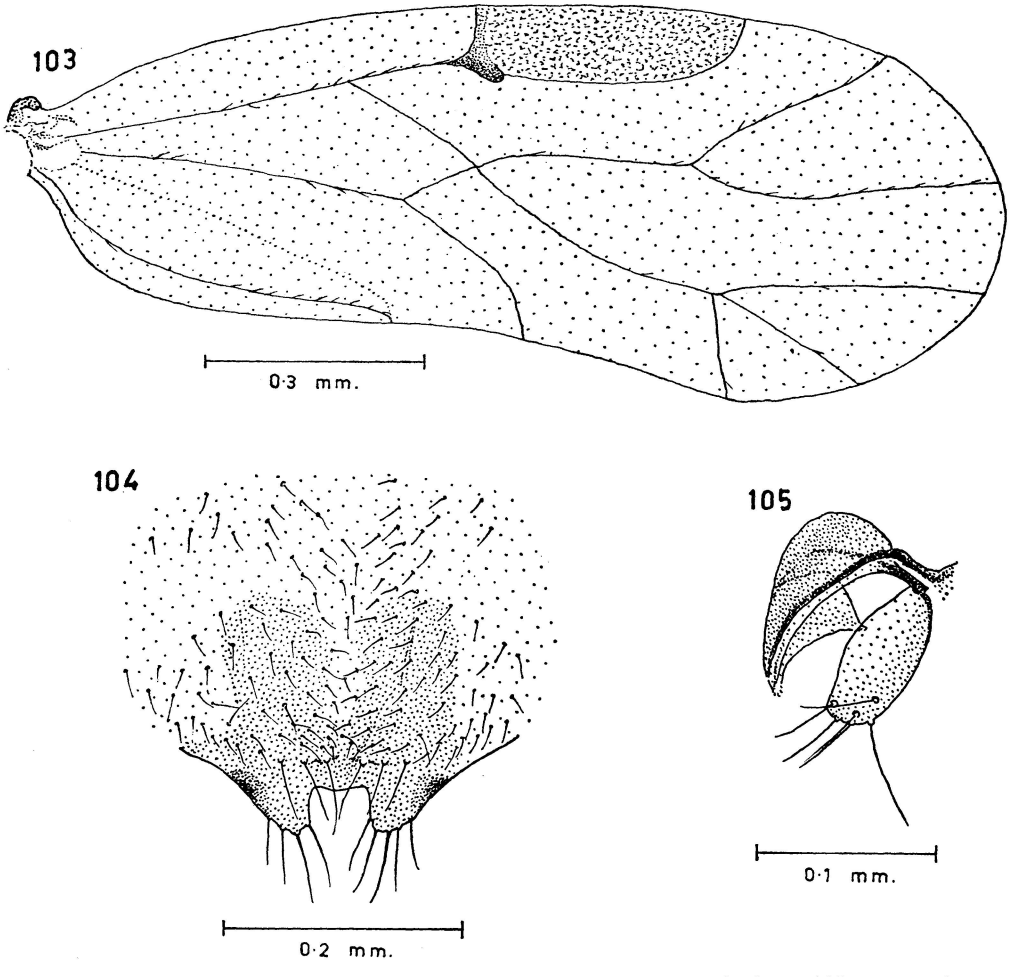


Fig. 103-105. *Ectopsocus amblyura* ♀: 103, fore wing; 104, subgenital plate; 105, gonapophyses.

segments light brown. Fore wing (fig. 103) almost hyaline, veins light brown. Hind wing lighter, veins light brown. Abdomen cream.

Morphology: Fore wing (fig. 103) margin bare; setae on veins short; pterostigma granulation coarse; veins *rs* and *m* meet at a point; origins of m_2 and m_3 very close. Hind wing with 3–6 (5 specimens) very fine, short marginal setae between *r* fork. Subgenital plate (fig. 104) apical lobes rounded, inner margins parallel; with 3 stout and 1 finer setae; sclerotization at anterior corners. Gonapophyses (fig. 105): ventral valve broad basally, tapering apically; outer valve short, broad, tapering slightly at both ends, with apical field of 4–6 long setae. Paraproct with a median transverse row of 4 long setae, and a very small double spine with unequal members on mesial face. Metric and meristic characters as in Table 9.

♂. *Coloration* (after 1 yr in alcohol): As ♀.

Morphology: Apex of abdomen lost.

DISTRIBUTION: Palawan.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7957) (tube PI26.4, slide PI26.4a, b), and allotype ♂ (tube PI26.5, slide PI26.5a), Aborlan, Palawan, on coconut thatch, 17.IV.1965, Thornton; paratypes 3 ♀♀, same data as holotype.

The female genitalia of this species resemble those of *E. denervus* (Philippines, Micronesia, Samoa) and *E. vachoni* Bad. (Africa, N. & S. America) (= *E. dimorphus* Mockford & Gurney). *E. amblyura* differs, however, in the pattern of sclerotization and in the number of apical setae on the subgenital plate.

Ectopsocus argus Thornton and Wong, new species

♀. *Coloration.* (after 1 yr in alcohol): Head buff, usual pattern light grayish brown. Clypeus with indistinct light brown striae. Maxillary palp light brown. Antenna light brown. Ocelli pale, central margin reddish. Eyes black. Thorax light reddish brown. Leg: coxa very light brown, trochanter and femur cream, tibia and tarsal segments light brown. Fore wing (fig. 106) very light brown, slightly darker along m_2, m_3 and cu_1. Hind wing lighter, veins light brown. Abdomen light buff.

Morphology: Fore wing (fig. 106) marginal setae very fine, very short, extra row from *sc* to r_{4+5}; setae on veins short; pterostigma coarsely granulate, apex smoothly rounded; veins *rs* and *m* meet at a point; *r* fork

Table 9. Metric (in mm) and meristic characters of 4 ♀♀ and 1 ♂ of *Ectopsocus amblyura*, of 2 ♀♀ of *E. fumidus*, and of *E. stictus* (♀ and ♂).

	E. amblyura					*E. fumidus*		*E. stictus*	
	♀				♂	♀		♀	♂
B	–	1.64	1.42	1.56	1.40	1.62	1.64	1.08	–
A	1.140	1.125	1.115	1.055	1.330	0.860	–	0.945	–
f_1	0.225	0.220	0.205	0.210	0.260	0.185	–	0.180	–
f_2	0.130	0.130	0.125	0.130	0.150	0.105	–	0.100	–
Ratio f_1/f_2	1.70	1.65	1.67	1.65	1.69	1.73	–	1.80	–
Ratio I. O.: D.	4.45	5.20	4.62	4.80	3.84	4.17	4.00	4.00	–
Fw	1.32	1.32	1.22	1.30	1.34	1.24	1.24	1.14	1.20
Hw	1.10	1.10	1.02	1.06	1.12	1.02	1.02	0.98	1.02
Hf	0.320	0.330	0.340	0.300	0.310	0.300	0.300	0.265	0.250
Ht	0.505	0.530	0.470	0.495	0.510	0.485	0.480	0.475	0.470
t_1	0.175	0.165	0.150	0.170	0.165	0.160	0.160	0.170	0.180
t_2	0.080	0.080	0.080	0.080	0.080	0.075	0.080	0.080	0.075
Ratio t_1/t_2	2.16	2.08	1.92	2.16	2.08	2.07	2.00	2.17	2.51
Ct	13	15	13	13	16	8	9	13	13
Tr	8	8	8	8	8	9	8	8	8

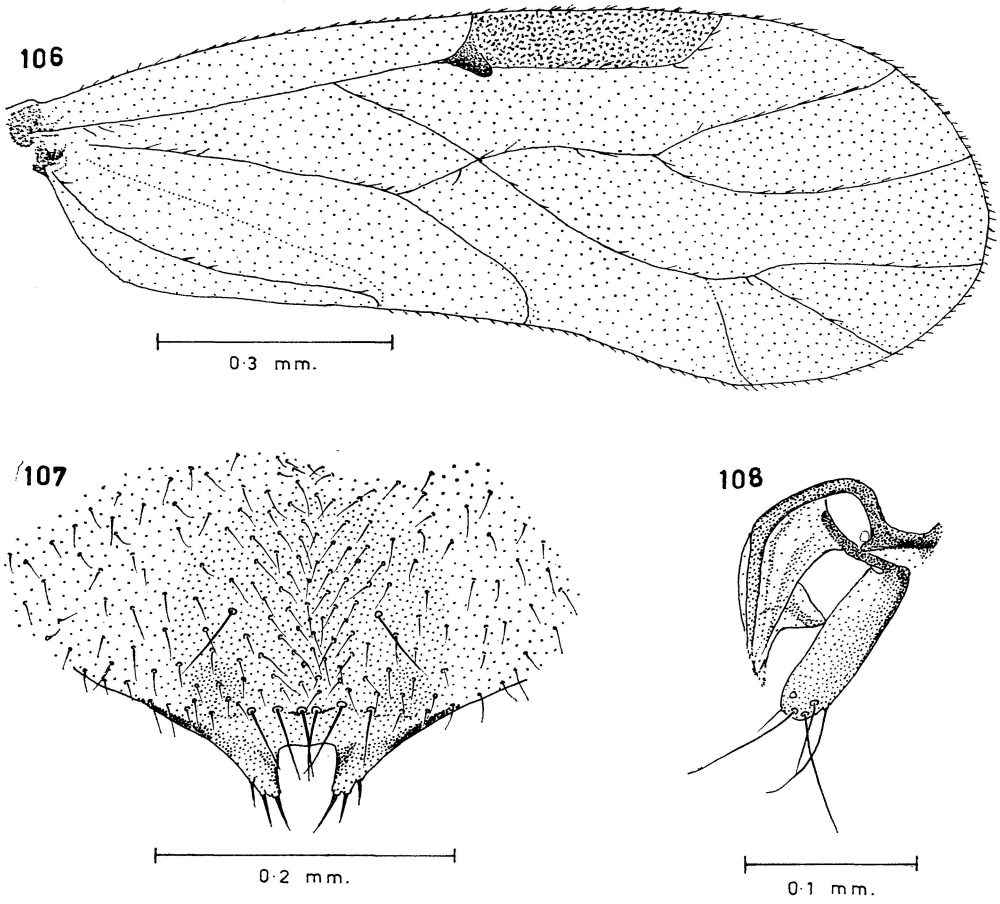


Fig. 106-108. *Ectopsocus argus* ♀: 106, fore wing; 107, subgenital plate; 108, gonapophyses.

about 2× as long as stem. Hind wing bare. Subgenital plate (fig. 107) apical lobes triangular, inner margins parallel; each bearing 3 short stout setae on lateral margin; sclerotization along inner margin and latero-anterior corner. Sclerotization on main plate as median large area and 2 small rounded areas anterior to apical lobes. Gonapophyses (fig. 108): ventral valve styliform; outer valve straight, with apical area of 6 setae. Paraproct with a median transverse row of 4 long setae, and a very small double spine on mesial face. Metric and meristic characters as in Table 8.

♂. Unknown.

DISTRIBUTION. Palawan.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7958) (tube PI11.1, slide PI11.1a, b), Aborlan, Palawan, on tree, 17.IV.1965, Thornton.

E. argus resembles somewhat members of the *cinctus* group, but differs from them in the absence of the fine seta on the subgenital plate apical lobe, and in the relatively small size and straight margins of the outer valve.

PHILIPPINE SUBREGION

Peripsocus pauliani Badonnel

See p. 20.

Ectopsocus aethiops var. **bakeri** Banks

See p. 16.

Ectopsocus basalis (Banks)

Micropsocus basalis Banks, 1937b, Philip. J. Sci. **63:** 135 (fig., distr.); 1938, Rev. Ent. Rio de J. **9:** 285–304 (dist.).

♀ (further description). *Morphology:* Subgenital plate (fig. 109) apical lobes narrow, triangular with blunt apex, each with 2 stout and 1 finer shorter seta; sclerotization at anterior corners. Sclerotization on main plate as 2 oval areas. Gonapophyses (fig. 110): ventral valve fairly broad basally, tapering apically to a point; outer valve gradually broadening from base, very broad subapically, with a fringe of very long marginal setae and a field of short setae in apical 1/2. Paraproct with a median transverse row of 5 long setae and an extra 1 near mesial margin, and a small double spine on mesial face. Metric and meristic characters as in Table 10.

♂ (further description). *Morphology:* Hypandrium (fig. 111) simple. Penis frame (fig. 112) inner parameres fused to a broad plate with posterolateral prongs directed laterally; a number of large triangular spines, small slender spines and tubercles on penis bulb; radula sclerites absent. Tergite 9 (fig. 113) broad, lateral margin ill-defined, with an apical comb of 35–37 (5 specimens) long slender teeth. Metric and meristic characters as in Table 10.

DISTRIBUTION: Luzon, Mindanao.

MATERIAL EXAMINED: Collected by Thornton; 28 ♀♀, 9 ♂♂, Tagaytay, Luzon, Taal Vista Lodge, 675 m, beating vegetation, 19.XI.1961; 1 ♀, 1 ♂, Los Banos, P. I., from *Pinus*, 7.IV. 1965.

E. basalis resembles *E. fullawayi* End. (Hawaii, Fiji, Samoa, Tubuai, Rapa, Tuamotu Archipelago) in female genitalia except that it lacks the persistent oviduct and thes clerotization on the lining of subgenital plate. Its male genitalia, however, are closer to those of *E. perkinsi* Banks (Hawaii, Fiji, Samoa, Tubuai) in hypandrium and tergite 9. Its penis frame is distinctive in the possession of spines instead of radula sclerites.

Table 10. Metric (in mm) and meristic characters of 5 ♀♀ and 5 ♂♂ of *Ectopsocus basalis*.

	♀					♂				
B	1.26	1.40	1.42	1.26	1.52	1.04	1.30	1.14	1.18	1.18
A	0.835	0.915	0.915	1.015	0.965	0.965	1.275	1.245	–	–
f_1	0.225	0.200	0.200	0.225	0.210	0.210	0.265	0.265	0.230	–
f_2	0.105	0.100	0.095	0.115	0.105	0.120	0.145	0.150	0.125	–
Ratio f_1/f_2	2.13	2.00	2.08	2.00	2.00	1.78	1.82	1.74	1.84	–
Ratio I. O.: D.	4.18	4.37	4.80	4.17	3.84	2.86	2.75	2.50	3.00	3.64
Fw	1.30	1.26	1.26	1.34	1.30	1.26	1.48	1.48	1.36	1.12
Hw	1.10	1.06	1.08	1.14	1.12	1.02	1.26	1.20	1.14	0.96
Hf	0.310	0.305	0.290	0.320	0.305	0.265	0.325	0.320	0.265	0.250
Ht	0.550	0.545	0.595	0.570	0.535	0.490	0.565	0.570	0.515	0.450
t_1	0.210	0.210	0.185	0.225	0.200	0.200	0.240	0.220	0.210	0.170
t_2	0.085	0.080	–	0.090	0.085	0.080	0.090	0.085	0.085	0.080
Ratio t_1/t_2	2.46	2.66	–	2.43	2.31	2.50	2.57	2.55	2.46	2.17
Ct	15	16	12	14	14	15	16	15	18	14
Tr	8	8	6	8	8	8	8	8	8	8

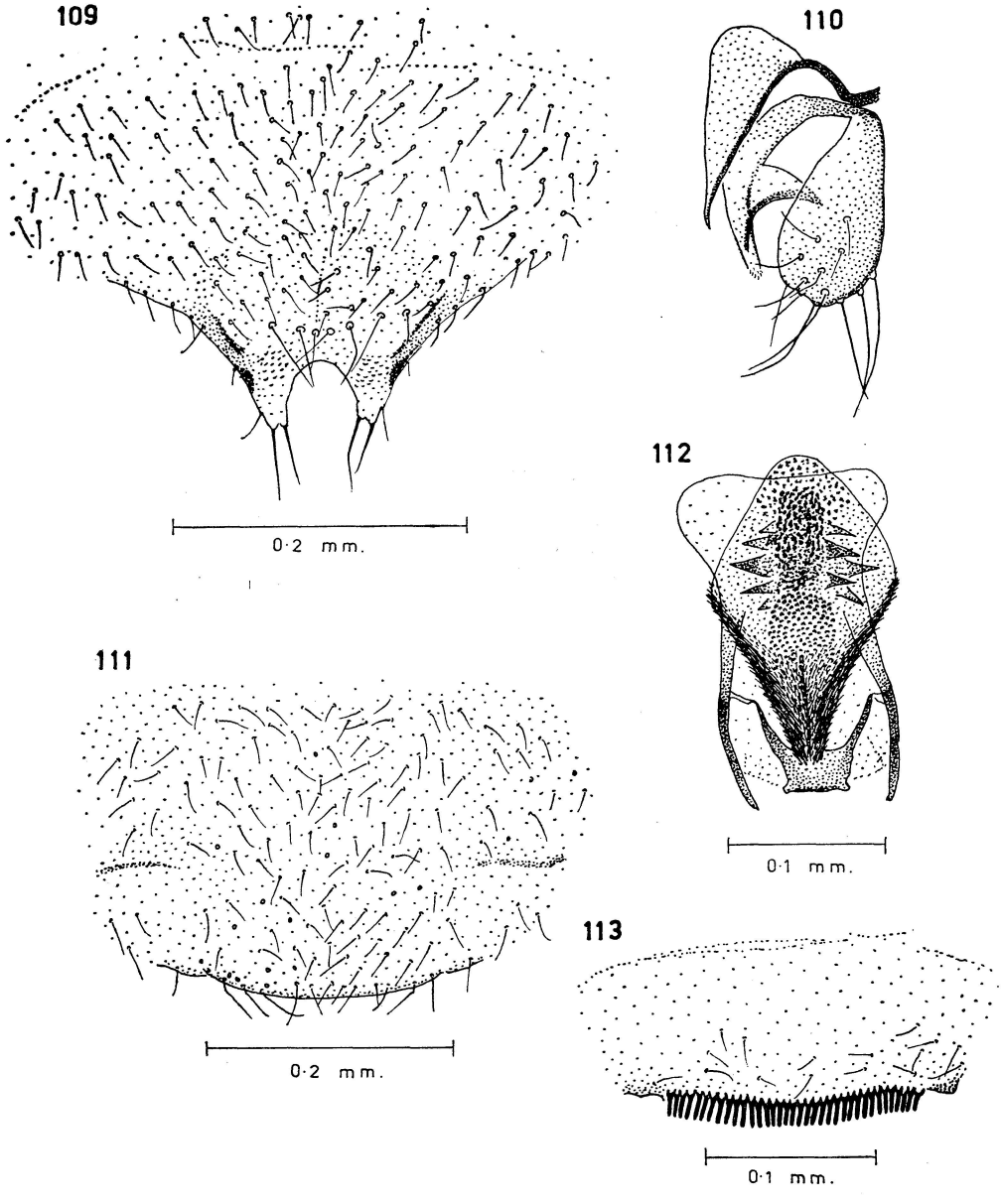


Fig. 109-113. *Ectopsocus basalis:* 109, subgenital plate; 110, gonapophyses; 111, hypandrium; 112, penis frame; 113, ♂ apical abdominal tergite. (110, 111 to common scale.)

Ectopsocus denervus Thornton and Wong, new species

See p. 95.

Ectopsocus fumidus Thornton and Wong, new species

♀. *Coloration* (after 2 yr in alcohol): Head buff, usual pattern and striae faint, setae brown. Sagittal suture dark brown. Maxillary palp light grayish brown basally darkening to grayish brown apically, cream at joints. Antenna: scape and pedicel grayish brown, rest broken. Ocelli pale. Eyes black. Thorax buff with light grayish-brown dorsal longitudinal median band and lateral band. Leg: light grayish brown, except trochanter and femur cream. Fore wing (fig. 114) light grayish brown, slightly darker in a curved apical band, along veins m_2, m_3, cu_1, and at nodulus; veins grayish brown. Hind wing paler; veins grayish brown. Abdomen cream.

Morphology: Head setae long. Fore wing (fig. 114) marginal setae very short, extra row from *sc* to m_1; setae on veins short, dense; veins *rs* and *m* fuse for a short length. Hind wing (fig. 115) with 4 very short setae on margin between *r* fork; course of r_{4+5} irregular. Subgenital plate (fig. 116) apical lobes short, truncate, mesial margins convergent; each lobe with 2 stouter and 1 fine setae. Gonapophyses (fig. 117): ventral valve narrow, pointed; outer valve slightly broadened subapically with a field of 6 long setae in apical 1/4. Paraproct with a median transverse row of 4 long setae, and a small double spine with unequal members on mesial face. Metric and meristic characters as in Table 9.

♂. Unknown.

DISTRIBUTION: Luzon.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7959) (tube PI6.2, slides PI6.2a, b), Manila, Philippines, 20.VII.1964, C. R. Baltazar; paratype 1 ♀, same collecting data.

E. fumidus has fore wing pattern and female genitalia similar to those of *E. maindroni* Bad. (widespread); however, it differs in having denser pigmentation around the apex of the fore wing, and in the apical lobes of the subgenital plate being shorter. In both specimens of this species the vein r_{4+5} in the hind wing does not reach the margin.

Ectopsocus intersitus Thornton and Wong, new species

♀. *Coloration* (after several yr in alcohol): Head light buff, usual pattern indistinct, very light grayish brown. Clypeus with indistinct, very light brown striae. Maxillary palp light brown. Antenna uniformly light brown. Ocelli pale. Eyes black. Mesothoracic and metathoracic terga light brown. Thoracic pleura light brown. Leg: light brown, except trochanter and femur lighter. Fore wing (fig. 118) very light brown, slightly darker along m_2, m_3 and apex of cu_1; veins light brown. Hind wing lighter than fore wing; veins light brown. Abdomen cream.

Morphology: Fore wing (fig. 118) fairly narrow; margin bare; veins with fairly long, sparse setae; *rs* and *m* fused for a short length. Hind wing bare. Subgenital plate (fig. 119) apical lobes triangular, each with a stout apical seta and 3 or 4 finer setae on outer margin; triangular sclerotization in latero-anterior corner. A very stout seta on main plate posterior to row of 6 long subapical setae. Latero-posterior sclerotization on main plate. Gonapophyses (fig. 120): valves elongate; ventral valve narrow, tapering apically; outer valve broadened subapically with 7 fine setae in apical 1/4. Paraproct with a median transverse row of 5 long setae, and a very small double spine on mesial face. Metric and meristic characters as in Table 11.

♂. Unknown.

DISTRIBUTION: Philippines.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7960) (tube PI1.1, slides PI1.1a, b), Mt. Malindang, 1100 m, Mutyo, Cenon, Philippines, Rabor & Gonzales.

The subgenital plate of *E. intersitus* resembles in form that of *E. cinctus* Th. (India, Hong Kong, Malaya, Vietnam) but the sclerotization is of the type of *E. maindroni* Bad. (widespread). Fore wing chaetotaxy is closer to *E. maindroni* than to *E. cinctus*. The stout median subapical seta is also present in *E. marginatus* (Micronesia), the male genitalia of which show definite resemblance to those of *E. maindroni*. This species is therefore considered to belong to the *maindroni* group; the discovery

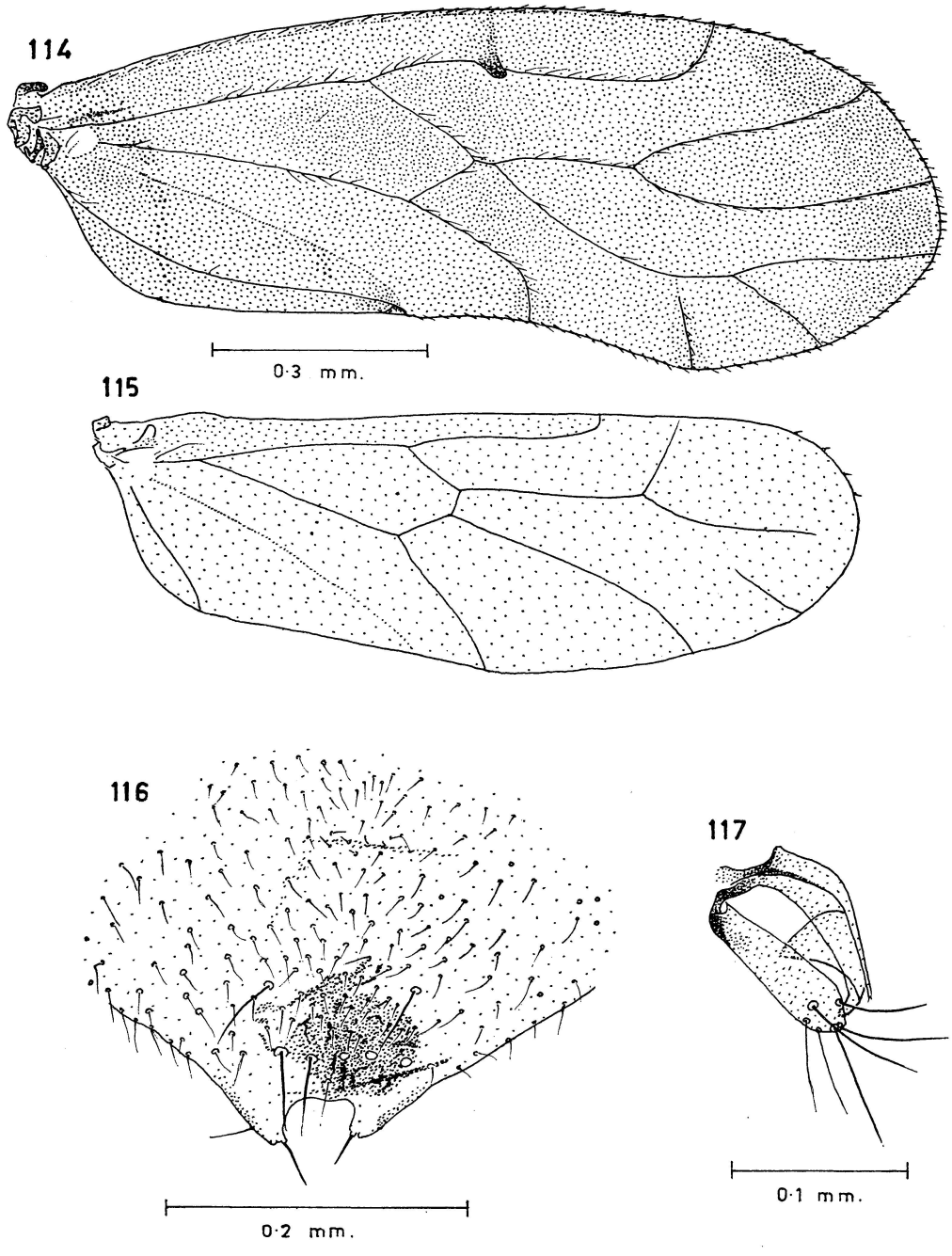


Fig. 114-117. *Ectopsocus fumidus* ♀: 114, fore wing; 115, hind wing; 116, subgenital plate; 117, gonapophyses. (114, 115 to common scale.)

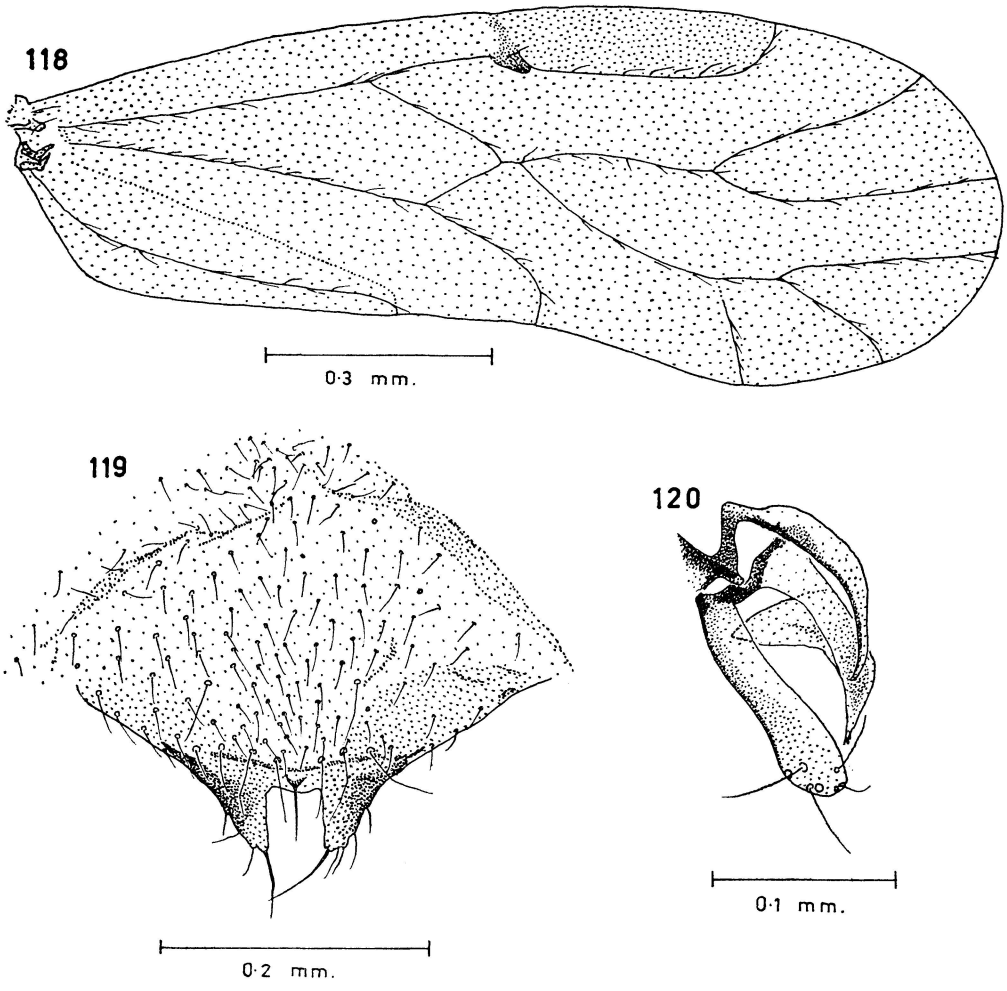


Fig. 118-120. *Ectopsocus intersitus* ♀: 118, fore wing; 119, subgenital plate; 120, gonapophyses.

of the male should clarify its position.

Ectopsocus salpinx Thornton and Wong, new species

♀. *Coloration* (after 1 yr in alcohol): Head light reddish brown, usual pattern indistinct, grayish brown. Clypeus with very faint, indistinct striae. Maxillary palp dark brown, white at joints. Antenna light brown. Ocelli pale, central margins bordered reddish brown. Eyes black. Mesothoracic terga reddish brown, a buff spot at center of notum; sutures indistinct. Metathoracic terga similar. Thoracic pleura brown. Leg: brown, except trochanter and femur light brown. Fore wing (fig. 121) light brown; venation dark brown. Hind wing similar. Abdomen buff with diffused dark brown bands dorsally and laterally.

Morphology: Head setae long, sparse. Fore wing (fig. 121) marginal setae very fine, short, extra row from *sc* to m_1; setae on veins short, fairly thick, sparse; veins *rs* and *m* meet at a point, or fuse for a short length, or are united by a short cross-vein; *r* fork more than 2× length of stem; pterostigma granulation coarse. Hind wing bare. Subgenital plate (fig. 122) apical lobes triangular with blunt apex; inner margins slightly

Table 11. Metric (in mm) and meristic characters of *Ectopsocus intersitus* (♀), and of 5 ♀♀ and 3 ♂♂ of *E. salpinx*.

	E. intersitus	*E. salpinx*							
	♀	♀					♂		
B	–	1.84	1.80	–	1.44	1.48	1.64	1.52	1.52
A	–	1.020	1.075	1.125	1.045	0.940	0.980	1.020	–
f_1	0.250	0.205	0.225	0.240	0.230	0.200	0.185	0.210	–
f_2	0.140	0.115	0.115	0.130	0.115	0.105	0.105	0.105	–
Ratio f_1/f_2	1.81	1.82	2.00	1.89	2.06	1.88	1.75	2.00	–
Ratio I. O.: D.	3.84	2.94	3.47	3.50	3.47	3.53	3.24	3.20	3.34
Fw	1.26	1.56	1.46	1.56	1.42	1.36	1.42	1.42	1.46
Hw	1.04	1.24	1.20	1.26	1.14	1.14	1.16	1.18	1.18
Hf	0.330	0.365	0.360	0.365	0.345	0.330	0.325	0.330	0.330
Ht	0.585	0.605	0.615	0.625	0.605	0.555	0.555	0.565	0.595
t_1	0.210	0.230	0.230	0.225	0.220	0.210	0.170	0.225	0.225
t_2	0.095	0.095	0.095	0.080	0.095	0.080	0.095	0.095	0.095
Ratio t_1/t_2	2.29	2.50	2.50	2.84	2.36	2.66	1.86	2.43	2.43
Ct	13	14	16	13	16	14	3	16	14
Tr	8	8	8	8	8	8	8	8	8

convergent; each with 3 stout and 1 fine setae on lateral margin; sclerotization complete. Sclerotization of main plate as 2 large rectangular areas almost meeting at mid line. Gonapophyses (fig. 123): ventral valve narrow; outer valve with long setae on outer and posterior margins of apical 1/4. Gonopore plate sclerotized, spermatheca and duct sclerotized, persistent. Paraproct with a median transverse row of 5 long setae, and a double spine on mesial face. Metric and meristic characters as in Table 11.

♂. *Coloration* (after 1 yr in alcohol): As ♀. Inverted V-shaped anterior band on hypandrium.

Morphology: Antenna thicker and with denser setae than ♀. Hypandrium (fig. 124) very large, covering more than 1/2 length of abdomen, with a pair of complex sclerotized apical knobs, and medial longitudinal perpendicular plate on inside anteriorly. Penis frame (fig. 125) large, elongate, tubular, with median, bluntly pointed, dorsally tilted closed sac projecting anteriorly, bearing on its ventral surface a strongly sclerotized X-shaped toothed excrescence (anterior arms longer and more strongly sclerotized); outer parameres broad, strongly chitinized in basal 1/2, bent at mid point through almost 90° mesially, tapering to a sharp point apically; inner parameres fused to a broad bow-shaped sclerite. Radula sclerites complex; a large, trumpet-shaped sclerite posteriorly, others not clear. The main tube is retained in position by the "catch" system of the anterior excrescence. Tergite 9 (fig. 126) vase-shaped, with apical comb of 24–25 (3 specimens) strong teeth; sclerotization lateral. Metric and meristic characters as in Table 11.

DISTRIBUTION: Malaya, Palawan, Luzon, and Micronesia.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7961) (tube PI24.1, slides PI24.1a, b), Aborlan, Palawan, coconut thatch, 17.IV.1965, Thornton; allotype ♂ (tube PI24.3, slides PI24.3a, b), same collecting data; paratypes 2 ♀♀, same collecting data.

MALAYA: 4 ♀♀, 1 ♂, near Simpang Pulai, Ipoh, on dead vegetation, 29.VII.1963, Lee.

PHILIPPINES: 2 ♀♀, 2 ♂♂, Los Banos, dead rattan and banana leaves, 7.V.1965, Thornton.

MICRONESIA: *S. MARIANAS: GUAM:* collected by Krauss from Mt. Lamlam: 2 ♀♀, II.1958; 1 ♀, 2 ♂♂, X.1957; 1 ♂, XII.1958.

E. salpinx clearly resembles *E. cinctus* Th. (India, Hong Kong, Malaya, Vietnam), *E. vilhenai* Bad. (Africa), and *E. halcrowi* Pearman (Africa, on rat) in genitalic characters. Of the 3, it resem-

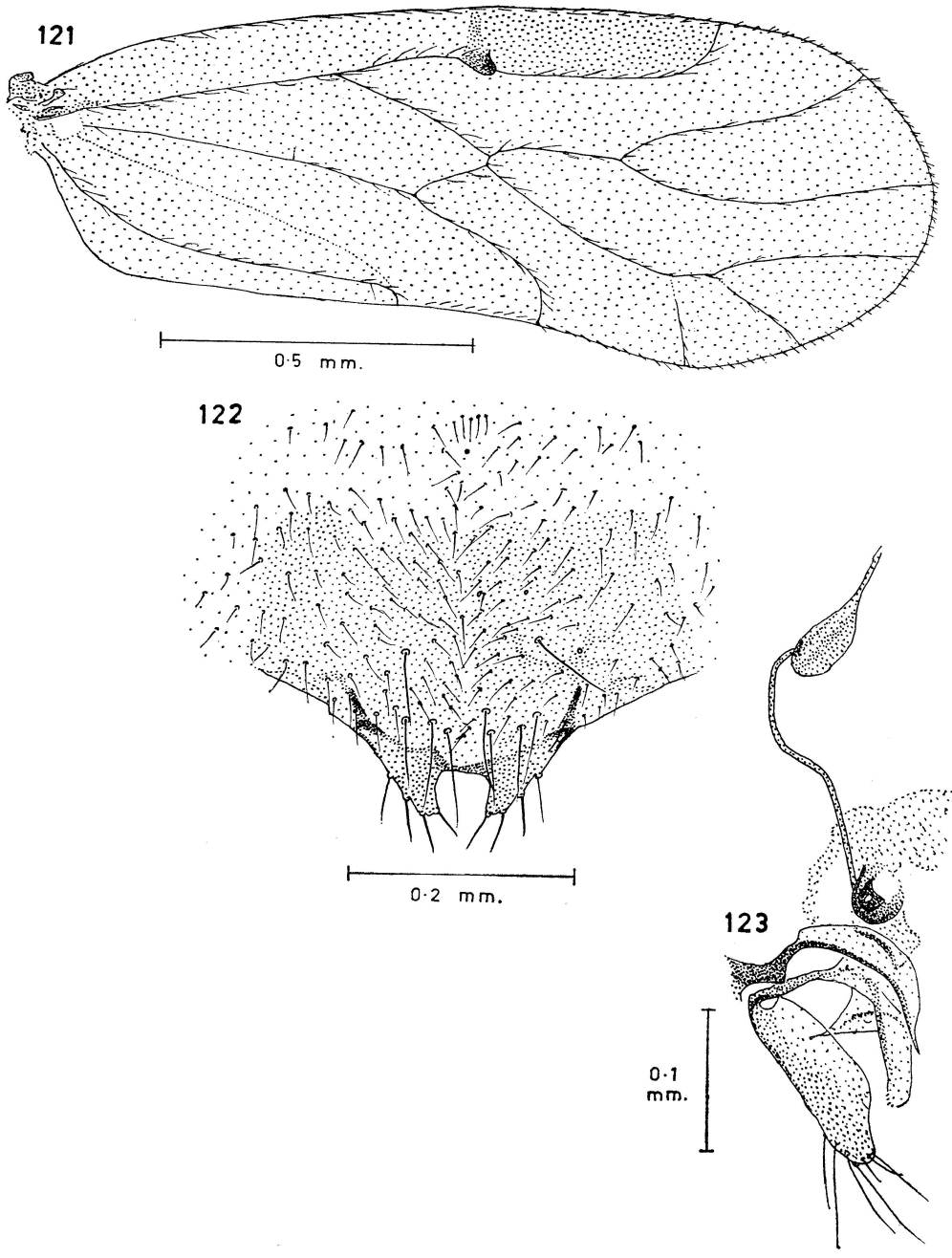


Fig. 121-123. *Ectopsocus salpinx:* 121, ♂ forewing; 122, subgenital plate; 123, gonapophyses.

Table 12. Metric (in mm) and meristic characters of *Peripsocus crenulatus* (♂), *P. denticulatus* (♂), *Ectopsocus erosus* (♂), *E. adelphos* (♂), *E. cristatus* (♀ and ♂), and *E. triangulus* (♀).

	P. crenulatus (♂)	*P. denticulatus* (♂)	*E. erosus* (♂)	*E. adelphos* (♂)	*E. cristatus* (♀)	*E. cristatus* (♂)	*E. triangulus* (♀)
B	1.64	–	1.02	1.36	–	–	1.10
A	1.820	–	–	–	–	1.425	–
f_1	0.280	0.285	–	0.280	0.305	0.320	–
f_2	0.225	0.225	–	0.200	–	0.225	–
Ratio f_1/f_2	1.25	1.26	–	1.40	–	1.41	–
Ratio I. O.: D.	0.79	0.60	1.74	1.64	3.25	1.91	3.72
Fw	1.78	1.74	1.38	1.56	2.02	1.90	1.36
Hw	1.36	1.34	1.14	1.26	1.52	1.54	1.10
Hf	0.345	0.345	0.345	0.365	0.435	0.410	0.310
Ht	0.700	0.675	0.585	0.570	0.720	0.715	0.515
t_1	0.210	0.210	–	0.185	0.230	0.240	0 185
t_2	0.105	0.085	–	0.080	0.095	0.095	0.080
Ratio t_1/t_2	2.00	2.48	–	2.34	2.50	2.58	2.34
Ct	16	17	–	10	11	16	13
Tr	27	32	8	8	8	8	8

bles *E. cinctus* most but differs in the subgenital plate apical lobes being broader and truncate, in the sclerotization on the main plate of subgenital plate, in the hypandrium apex, in radula sclerites, and in tergite 9 ornamentation.

Ectopsocus speciosus Thornton and Wong, new species

See p. 87.

Ectopsocus stictus Thornton and Wong, new species

♀. *Coloration* (after 1 yr in alcohol): Vertex dark brown, with a pale X-shaped area radiating from ocelli, anterior arms of which are traversed by brown-bordered frontal suture; area adjacent to ocelli very light brown. Frons with anterior margin very light brown, and a pale spot mesial to anterior socket. Clypeus brown, striae indistinct. Anteclypeus pale. Labrum dark brown. Gena brown, a narrow oblique pale band from antennal socket to orbit, a wider pale band more ventrally and pale ventral margin. Maxillary palp brown. Antenna: scape brown, pedicel brown with light brown apex; flagellum light brown. Ocelli pale, on dark brown protuberance. Eyes black. Mesothorax: antedorsum and dorsal lobes dark brown, scutellum very dark brown, a narrow pale longitudinal band along mid line dilated at dorsum; sutures very dark brown. Metathoracic terga paler, similar. Thoracic pleura dark brown. Leg: coxa dark brown, trochanter pale, femur and tibia dark brown, tarsal segments brown, pale at all joints. Fore wing (fig. 127) dark brown, finely punctated by numerous hyaline spots as figured; veins brown, bordered brown. Hind wing light brown, darker in costal cell and at apex of vein cu_1; veins brown, color of *m* fading towards margin. Abdomen pale with diffuse dark brown pigmentation.

Morphology: Fore wing (fig. 127) fairly broad, marginal setae fairly long, extra row from *sc* to m_1; setae on veins fairly long, sparse; pterostigma very slightly broader apically, veins *rs* and *m* united by a short cross-vein; *m* sinuous beyond fusion with *rs*. Hind wing bare; vein r_{2+3} recurved. Subgenital plate (fig. 128) apical lobes triangular, each with 2 or 3 stout and 1 finer setae; sclerotization at anterior corners. Sclerotization on main plate as 2 oval areas. Ten (not 6) large subapical setae on main plate. Gonapophyses (fig. 129): ventral valve broad basally, constricting to a point apically; outer valve club-shaped, broadening gradually from base, with 4 long marginal setae and 7 short setae in apical 1/2. Paraproct with a median transverse row of 4 long setae and 1 seta near margin. Metric and meristic characters as in Table 9.

♂. *Coloration* (after 1 yr in alcohol): As ♀.

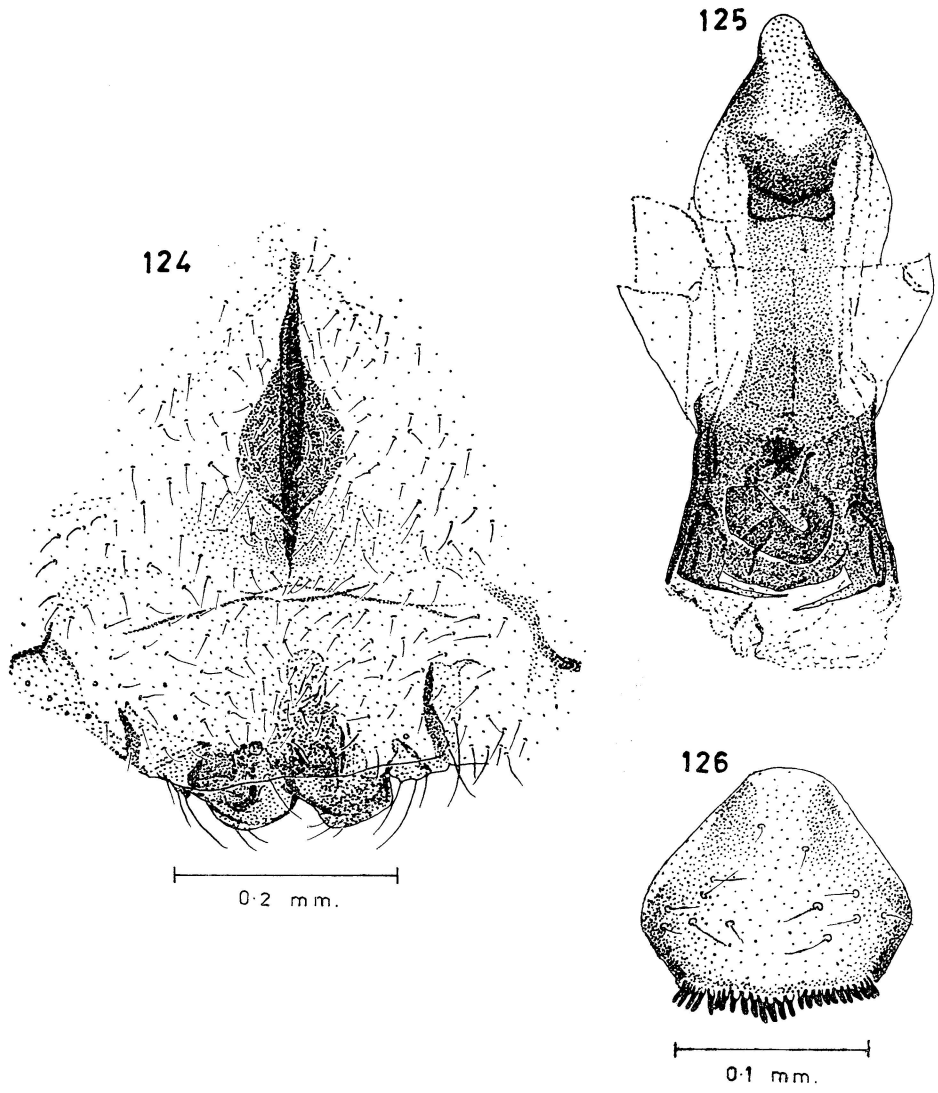


Fig. 124-126. *Ectopsocus salpinx:* 124, hypandrium; 125, penis frame; 126, ♂ apical abdominal tergite. (124, 125 to common scale.)

Morphology: Hypandrium (fig. 130) simple. Penis frame (fig. 131) inner parameres fused, apex produced to a short beak, radula sclerites absent. Tergite 9 (fig. 132) broad, lateral margin straight, with apical comb of 31 small teeth. Metric and meristic characters as in Table 9.

DISTRIBUTION: Lozon.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7962) (tube PI50.1, slides PI50.1a, b), Los Banos, N. I., Philippines, on *Pinus*, 7.V.1965, Thornton; allotype ♂ (tube PI50.2, slides PI50.2a, b).

The fore wing of *E. stictus* recalls that of *E. basalis* Banks (Philippines), but the hyaline spots are more numerous and the pterostigma, having 3 hyaline spots, appears banded. The female

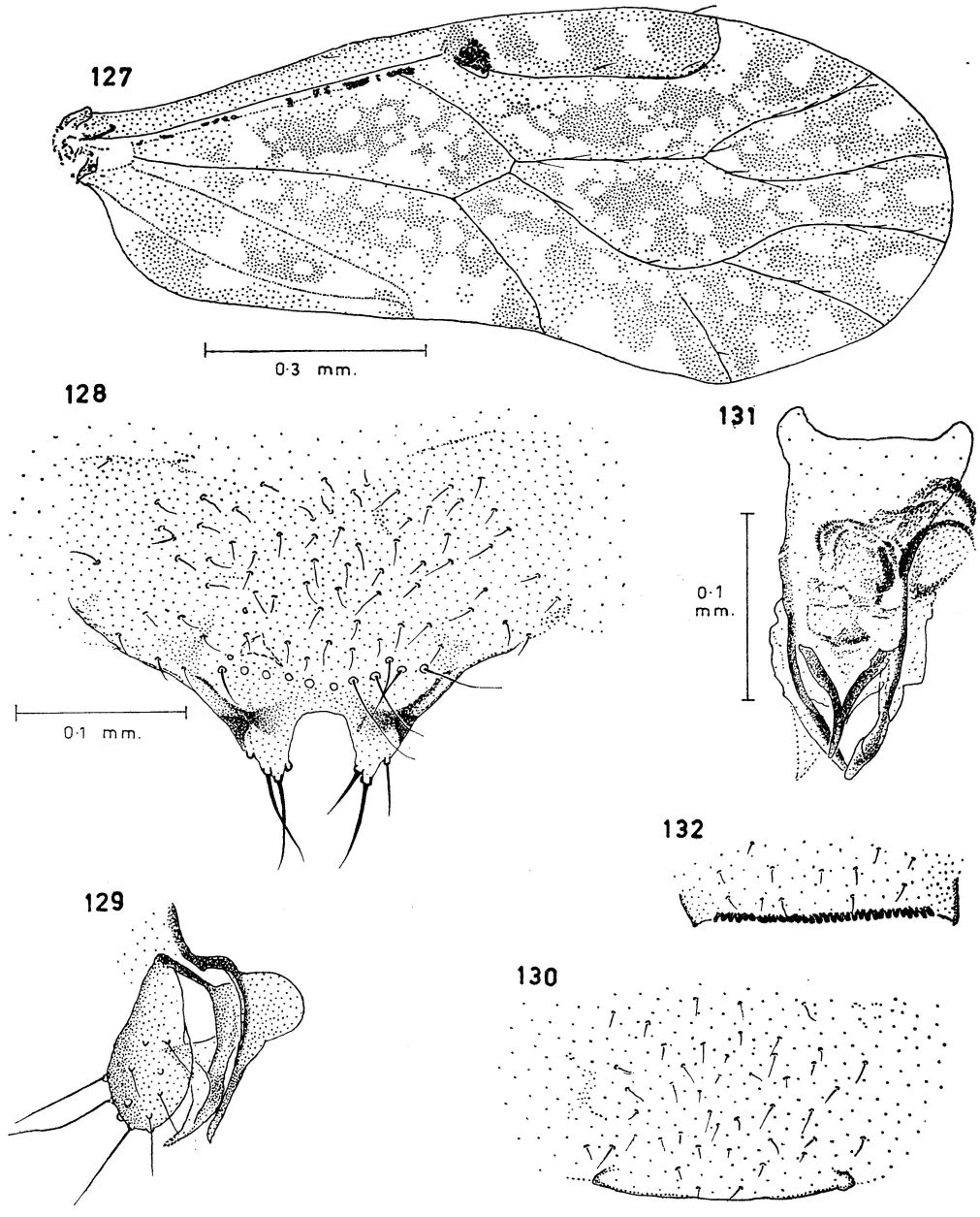


Fig. 127-132. *Ectopsocus stictus:* 127, ♀ fore wing; 128, subgenital plate; 129, gonapophyses; 130, hypandrium; 131, penis frame; 132, ♂ apical abdominal tergite. (128, 129 and 130, 131, 132 to common scales.)

Table 13. Metric (in mm) and meristic characters of 2 ♂♂ of *Ectopsocus dicroglossus*, 2 ♀♀ and 2 ♂♂ of *E. nidicolus*, and of 1 ♀ and 2 ♂♂ of *E. speciosus*.

	E. dicroglossus		*E. nidicolus*				*E. speciosus*		
	♂		♀		♂		♀	♂	
B	1.26	1.44	1.30	1.40	–	1.40	–	1.10	–
A	1.335	1.455	0.880	0.925	–	1.100	–	1.140	1.085
f_1	0.260	0.280	0.160	0.160	–	0.185	–	0.185	0.185
f_2	0.185	0.190	0.095	0.100	–	0.150	–	0.120	0.120
Ratio f_1/f_2	1.39	1.45	1.71	1.60	–	1.47	–	1.56	1.61
Ratio I. O.: D.	1.48	1.52	3.33	3.50	2.66	3.08	4.50	1.50	1.78
Fw	1.64	1.64	1.08	1.14	1.68	1.18	1.26	1.26	1.26
Hw	1.30	1.32	–	0.96	1.38	1.00	–	1.02	1.00
Hf	0.345	0.370	0.260	0.270	0.350	0.260	0.330	0.285	0.265
Ht	0.565	0.595	0.435	0.390	0.650	0.465	0.555	0.515	0.490
t_1	0.165	0.190	0.170	0.180	–	0.185	0.190	0.205	0.180
t_2	0.080	0.095	0.080	0.080	–	0.075	0.085	0.085	0.075
Ratio t_1/t_2	2.08	2.07	2.19	2.25	–	2.55	2.23	2.38	2.48
Ct	11	10	12	12	–	15	11	15	14
Tr	8	8	7	8	8	8	8	9	8

and male genitalia are also of the *basalis* type, but can be distinguished by the beak of the fused inner parameres of the penis frame and the absence of radula sclerites and spines on the penis bulb.

PAPUAN SUBREGION

Peripsocus suffitus Enderlein

Peripsocus suffitus Enderlein, 1903b, Ann. Hist. Nat. Mus. Hung. **1:** 293.— Banks, 1942, Bull. B.P. Bishop Mus. **172:** 27.— Soehardjan, 1958, Idea **11**(1): 25–32.

DISTRIBUTION: New Guinea, Guam.

Peripsocus crenulatus Thornton and Wong, new species

♂. *Coloration* (after 4 yr in alcohol): Head light brown, a large grayish brown mark covering most of vertex leaving a light brown area round ocelli and 2 small light brown spots mesial to orbit. Sagittal suture dark brown. Clypeus with indistinct, slightly darker oblique striae. Anteclypeus cream with narrow brown posterior margin. Labrum brown. Gena light brown. Maxillary palp brown, apical segment darker, white at joints. Antenna uniformly light brown. Ocelli pale on dark brown protuberance. Eyes black. Mesothorax: antedorsum brown with a narrow cream line along mid line and along posterior margin; a cream spot at center of dorsum, dorsal lobes brown with cream posterior margin; scutellum brown; sutures dark brown. Metathoracic terga similar. Thoracic pleura brown. Leg: brown, except trochanter and femur cream. Fore wing (fig. 133) almost hyaline, apical 1/2 of costal cell very dark brown, pigmentation extends as a broad light brown transverse band to nodulus; pterostigma mostly white, opaque, with a small light brown patch at apex; veins brown, darker in pigmented area. Hind wing almost hyaline, light brown in costal cell; veins brown fading towards apical and posterior margins. Abdomen cream with bands of diffuse dark brown granules, apical segment brown.

Morphology: Antenna fairly thick, with dense setae. Hypandrium (fig. 134) simple, setose. Penis frame (fig. 135) closed, strongly sclerotized, anterior end tapering, rounded, posterior end produced to a median long beak and 2 long curved side arms. Median radula sclerite small, lateral radula sclerites with broad bases and long slender portion crossing transversely. Abdominal tergite 9 with median posterior projection broad, low, with 7 small crenate lobes, median one largest, each bearing a number of minute, rod-like spinelets (fig. 136). Metric and meristic characters as in Table 12.

♀. Unknown.

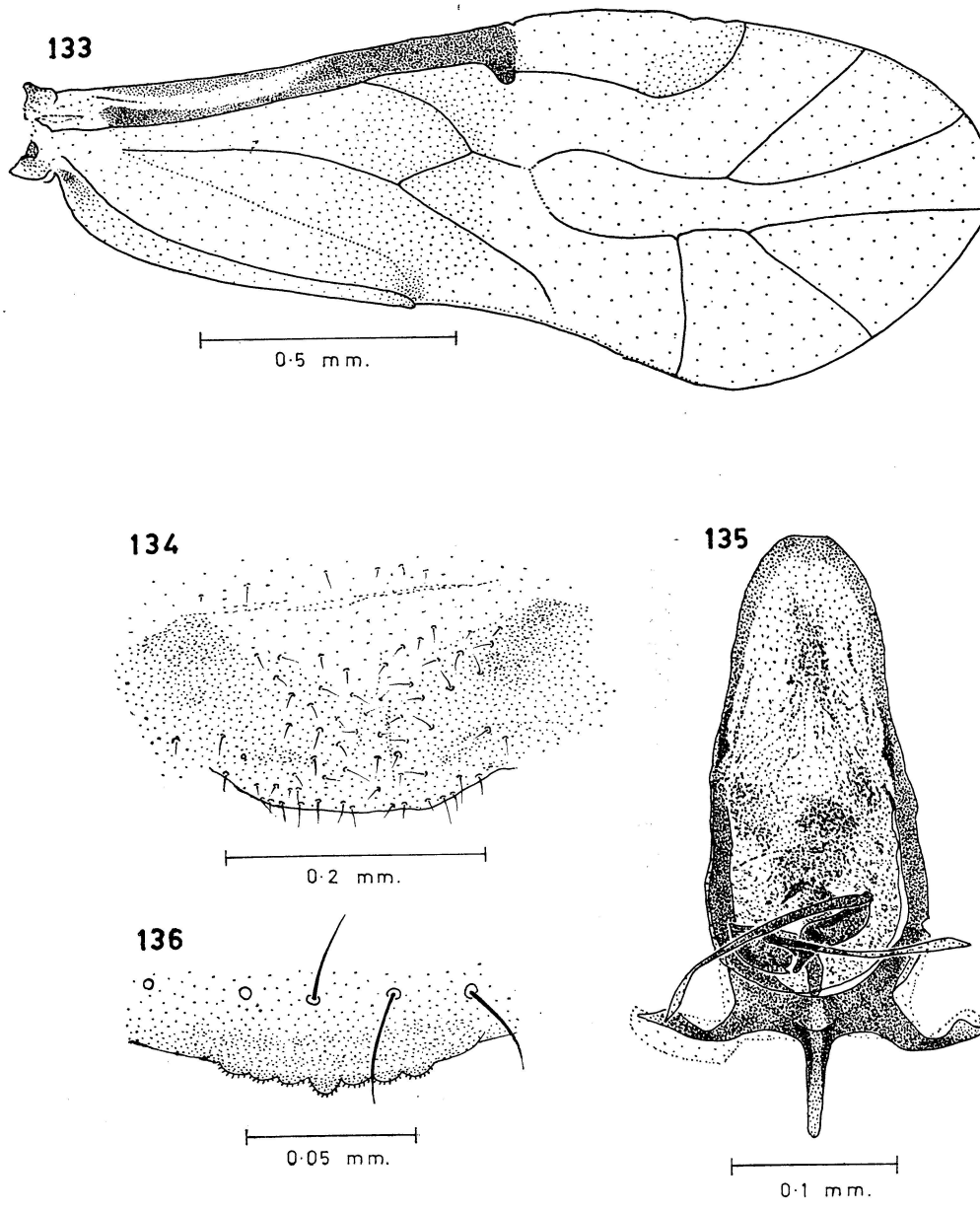


Fig. 133-136. *Peripsocus crenulatus* ♂: 133, fore wing; 134, hypandrium; 135, penis frame; 136, caudal comb.

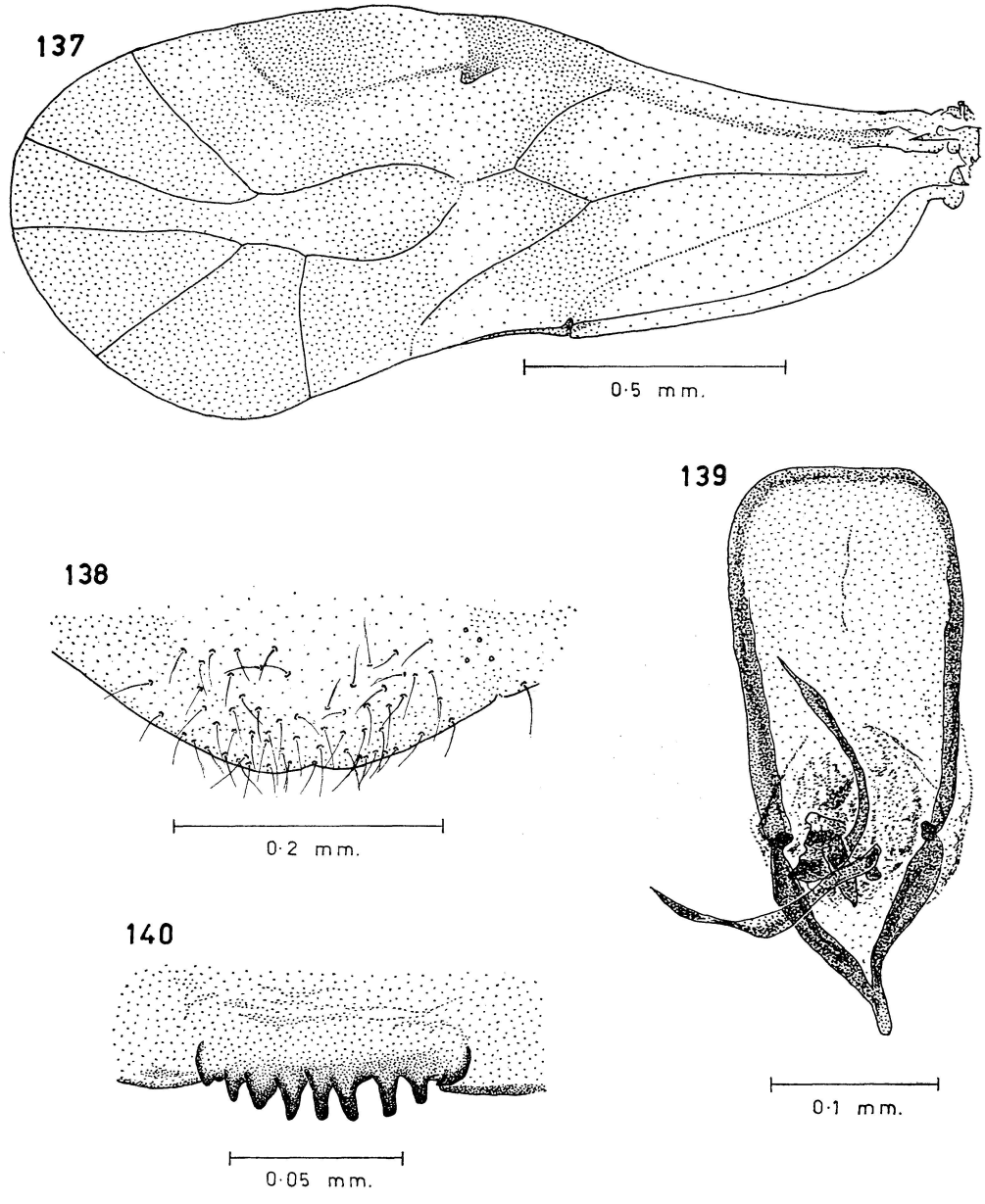


Fig. 137-140. *Peripsocus denticulatus* ♂: 137, fore wing; 138, hypandrium; 139, penis frame; 140, caudal comb.

DISTRIBUTION: NW New Guinea.

MATERIAL EXAMINED: Holotype ♂ (BISHOP 7963) (tube NG3.1, slides NG3.1a, b), Waris, New Guinea, at light, 8, 9.VIII.1959. T. C. Maa.

The wing pattern of this species is related to that of *P. anoplus* (Malaya), differing in possession of a small pigmented spot at the apex of the pterostigma. It differs further in head pattern and male genitalic characters. This species can be distinguished from other peripsocids by its peculiar caudal comb and penis frame.

Peripsocus denticulatus Thornton and Wong, new species

♂. *Coloration* (after 4 yr in alcohol): Head light brown, a large brown patch covering most of vertex leaving a light brown area around ocelli. Sagittal suture dark brown. Clypeus with indistinct, slightly darker oblique striae. Anteclypeus cream with a narrow brown posterior border. Labrum brown. Gena light brown. Maxillary palp lost. Antenna with basal 6 segments uniformly brown, rest broken off. Ocelli pale on dark brown protuberance. Eyes black. Mesothorax: antedorsum brown, anterior corner cream; a small cream spot at center of dorsum, dorsal lobes brown with cream posterior border; scutellum light brown; sutures dark brown. Metathoracic terga similar. Thoracic pleura brown. Leg: basal 1/2 of coxa brown, apical 1/2 cream, trochanter and femur cream, tibia and tarsal segments brown in fore and middle leg, light brown in hind leg. Fore wing (fig. 137) smoky light brown, darker in an irregular transverse band from apex of costal cell to nodulus, lighter on either side; basal 1/2 of pterostigma white, opaque, apical 1/2 light brown; veins brown in pigmented areas, lighter elsewhere. Hind wing very light smoky brown, darker in costal cell; veins brown in basal 1/2, fading towards apical and posterior margins. Abdomen cream, apical segment brown.

Morphology: Antenna fairly thick, with dense setae. Hypandrium (fig. 138) simple, apex slightly indented at center, setose. Penis frame (fig. 139) closed, anterior end square, sides subparallel, posteriorly produced to a short beak. Median radula sclerite small, lateral radula sclerites long, slender, curved. Abdominal tergite 9 with posterior row of 9 prominent strong teeth (fig. 140). Metric and meristic characters as in Table 12.

♀. Unknown.

DISTRIBUTION: NW New Guinea.

MATERIAL EXAMINED: Holotype ♂ (BISHOP 7964) (tube NG3.2, slides NG3.2a, b), Waris, New Guinea, at light, 8, 9.VIII.1959, Maa.

This species has a highly peculiar caudal comb and penis frame which show no close similarities to other species.

Ectopsocus erosus (Enderlein)

Micropsocus erosus Enderlein, 1903b, Ann. Hist. Nat. Mus. Hung. **1:** 297 (fig., distribution).

Ectopsocus erosus: Enderlein, 1906a, Zool. Jahrb. Abt. Syst. **23:** 401–12.– Soehardjan, 1958, Idea **11**(1): 25–32 (distribution).

♂ (further description). *Morphology:* Hypandrium (fig. 142) simple. Penis frame (fig. 143) inner parameres fused to a median keel-like knob; an anterior simple, curved, pointed radula sclerite, and a posterior, strongly sclerotized, triradiate radula sclerite with hooked apex and 1 anterior slender curved arm; outer parameres well sclerotized, rounded. Tergite 9 (fig. 144) long, broader subbasally, with apical comb of 29 small teeth and 4 anterolateral groups of tubercles; wide lateral bands of sclerotization. Metric and meristic characters as in Table 12.

DISTRIBUTION: New Guinea.

MATERIAL EXAMINED: 1 ♂, Papua, C. District, Port Moresby (Boroko), New Guinea, 3 p.m. to 7 p.m., 6, 7.XI.1960, Malaise trap, J. L. Gressitt.

E. erosus resembles *E. fenestratus* (Micronesia) in male genitalic characters; it differs in fore wing pattern by having a larger number of smaller hyaline spots, in that the long radula sclerite is slen-

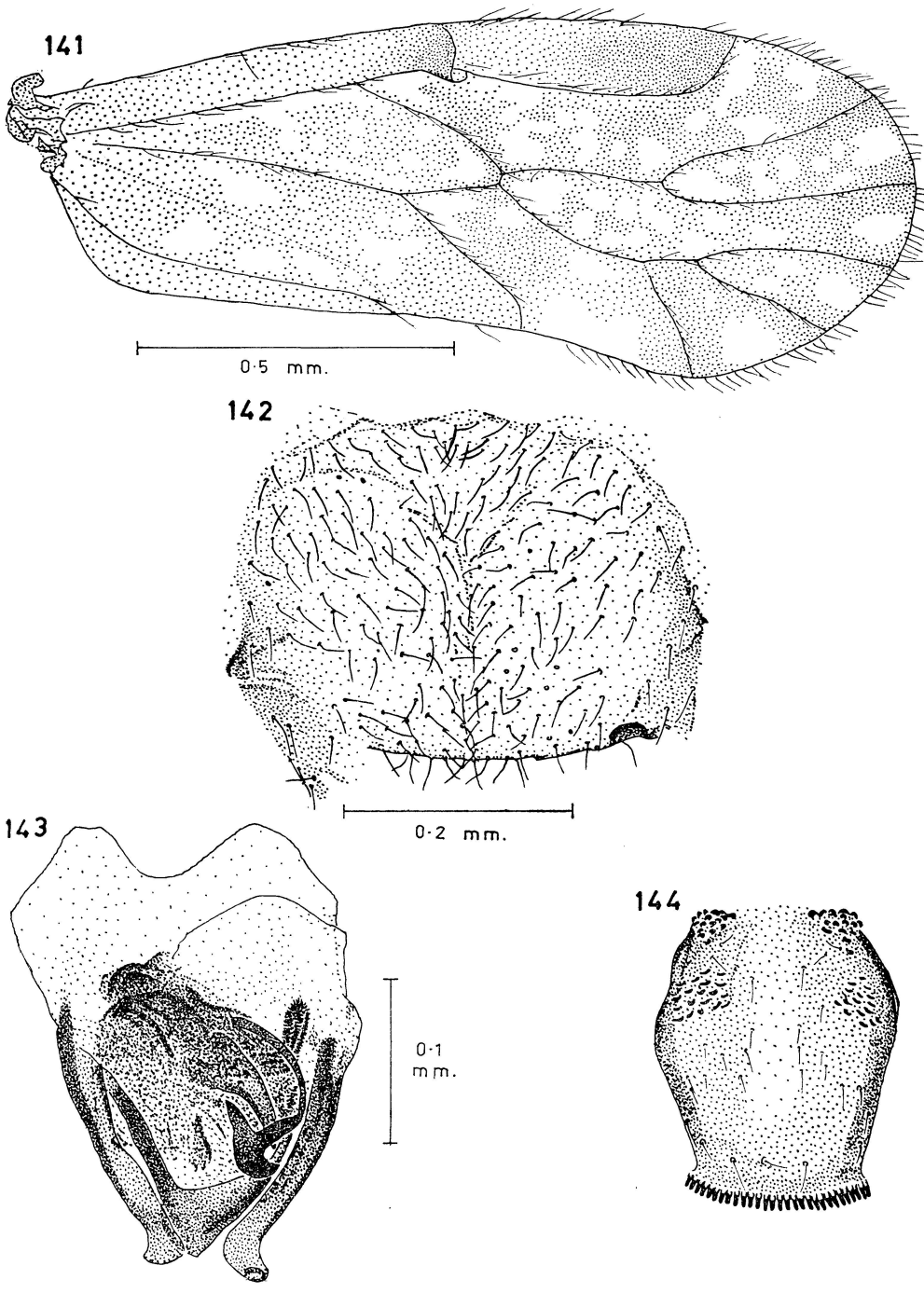


Fig. 141-144. *Ectopsocus erosus:* 141, ♂ fore wing; 142, hypandrium; 143, penis frame; 144, ♂ apical abdominal tergite. (143, 144 to common scale.)

der and simple, and in tergite 9 by having 4 groups of tubercles. The keel-like apex of the fused inner parameres of this species and *E. fenestratus* is unusual in the genus.

Ectopsocus myrmecophilus (Enderlein)

See p. 16.

Ectopsocus waterstradti (Enderlein)

See p. 59.

Ectopsocus adelphos Thornton and Wong, new species

♂. *Coloration* (after 7 yr in alcohol): Head light buff, usual pattern very faint, pale brown. Sagittal suture brown. Clypeus with indistinct, very light brown oblique striae. Maxillary palp light buff. Antenna: scape and pedicel light brown, basal segments of flagellum buff, rest lost. Ocelli pale. Eyes black. Mesothoracic terga buff, except scutellum light buff; sutures light brown. Metathoracic terga similar. Thoracic pleura light buff. Leg: basal segments cream, tibia and tarsal segments very light brown. Fore wing (fig. 145) very light brown; veins light brown. Hind wing paler, veins light brown. Abdomen cream.

Morphology: Setae on head stout. Fore wing (fig. 145) marginal setae very fine, short, extra row from *sc* to r_{4+5}; setae on veins fairly dense; veins *rs* and *m* fuse for a short length, origins of m_2 and m_3 very close. Hind wing with 2 fine, short marginal setae between *r* fork. Hypandrium (fig. 146) simple. Penis frame (fig. 147) tubular, inner parameres with detached rake-like median portion, 3 radula sclerites. Tergite 9 (fig. 148) broad, lateral margin straight, with apical comb of 40 small, closely packed teeth. Metric and meristic characters as in Table 12.

♀. Unknown.

DISTRIBUTION: NW New Guinea.

MATERIAL EXAMINED: Holotype ♂ (BISHOP 7965) (tube NG3.4, slide NG3.4a, b), Waris, NW New Guinea, at light, 8, 9.VIII.1959, Maa.

E. adelphos bears a remarkable resemblance in male genitalia to *E. dicroglossus*, also from New Guinea, differing only in the penis frame being tubular and in the detached median portion of the inner parameres being slightly different in shape at apex. Tergite 9 is of the *perkinsi-basalis* type.

Ectopsocus cristatus Thornton and Wong, new species

♀. *Coloration* (after 6 yr in alcohol): Head brown, markings hardly discernible. Maxillary palp light brown, apical 1/2 of terminal segment brown. Antenna: scape and pedicel brown, 1st flagellar segment light brown basally, darkening in apical 1/2, rest of flagellum darkening towards apex. Ocelli pale. Eyes black. Thoracic sclerites light brown. Leg: light brown, except trochanter and femur pale. Fore wing (fig. 149) very light brown; veins light brown. Hind wing almost hyaline; veins light brown, fading towards apical and posterior margins. Abdomen pale.

Morphology: Antennal setae long. Fore wing (fig. 149) margin bare; setae on veins fairly long, sparse; veins *rs* and *m* fused for a short length or united by a short crossvein. Hind wing bare. Subgenital plate (fig. 150) apical lobe ill-defined, apex indented, with 2 or 3 stout and 1 fine setae on either side; sclerotization at anterior corners. Sclerotization on main plate as 2 ovoid areas, on lining as 2 posterolateral patches. A row of 8 (not 6) subapical large setae on main plate. Gonapophyses(fig. 151): ventral valve fairly narrow, constricting apically, with apical field of minute pegs; outer valve broadened subapically, with apical field of 8 setae and subapical field of spinelets on mesial surface. Paraproct with a median transverse row of 9 or 10 long setae, and a very small double spine on mesial face. Metric and meristic characters as in Table 12.

♂. *Coloration* (after 6 yr in alcohol): As ♀.

Morphology: Antenna longer and thicker than in ♀. Hypandrium (fig. 152) simple, 1 long marginal seta on each side. Penis frame (fig. 153) inner parameres fused to a median broad plate with 2 posterior prongs directed posterolaterally; 3 radula sclerites. Tergite 9 (fig. 154) as broad as long, lateral margin convex, with apical comb of 21 teeth, a group of tubercles on each side of mid line and an anterior V-shaped sclerotized ridge. Metric and meristic characters as in Table 12.

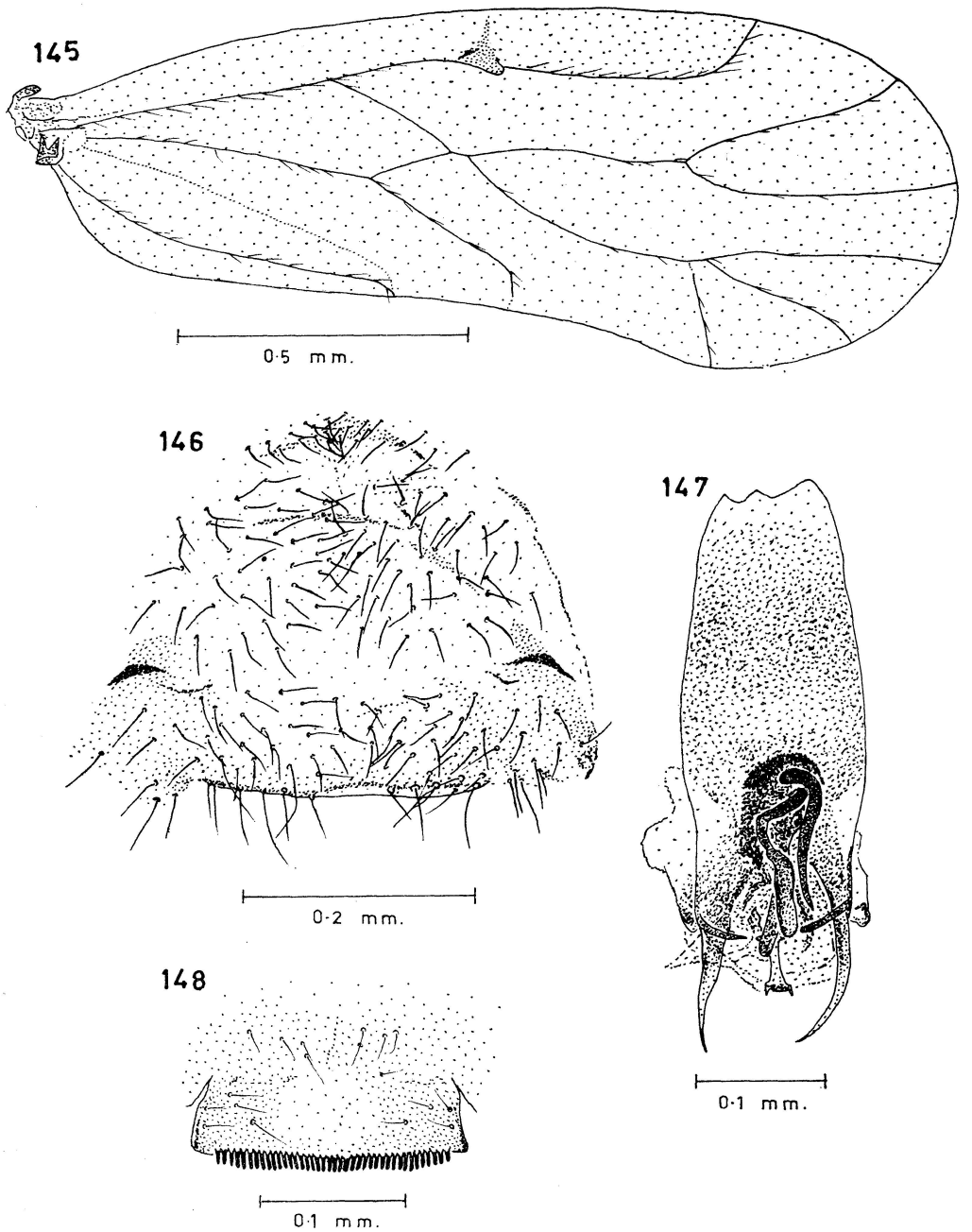


Fig. 145-148. *Ectopsocus adelphos* ♂: 145, fore wing; 146, hypandrium; 147, penis frame; 148, apical abdominal tergite.

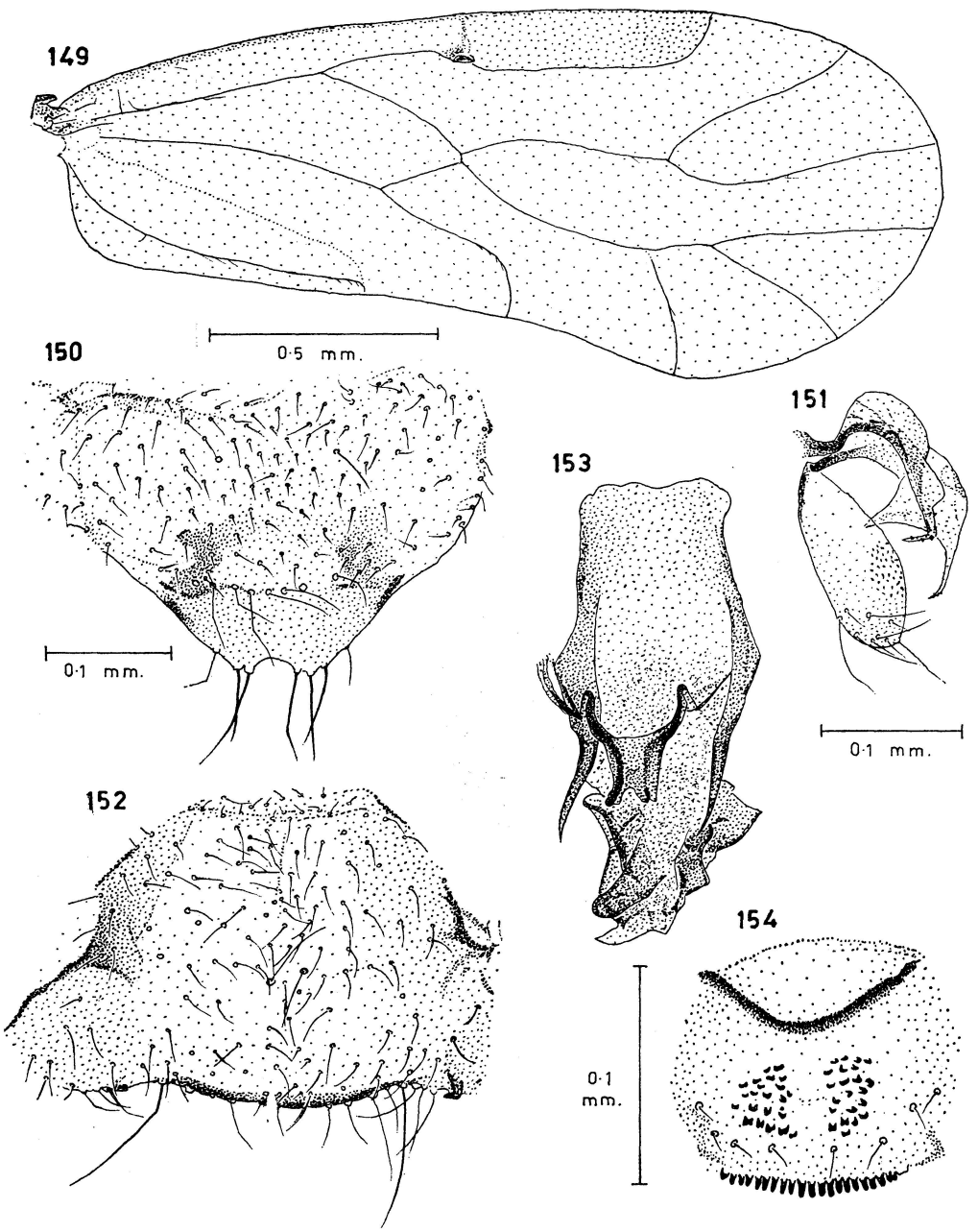


Fig. 149-154. *Ectopsocus cristatus:* 149, ♂ fore wing; 150, subgenital plate; 151, gonapophyses; 152, hypandrium; 153, penis frame with aedeagal sclerites on eversion; 154, ♂ apical abdominal tergite. (150, 152 and 151, 153 to common scales.)

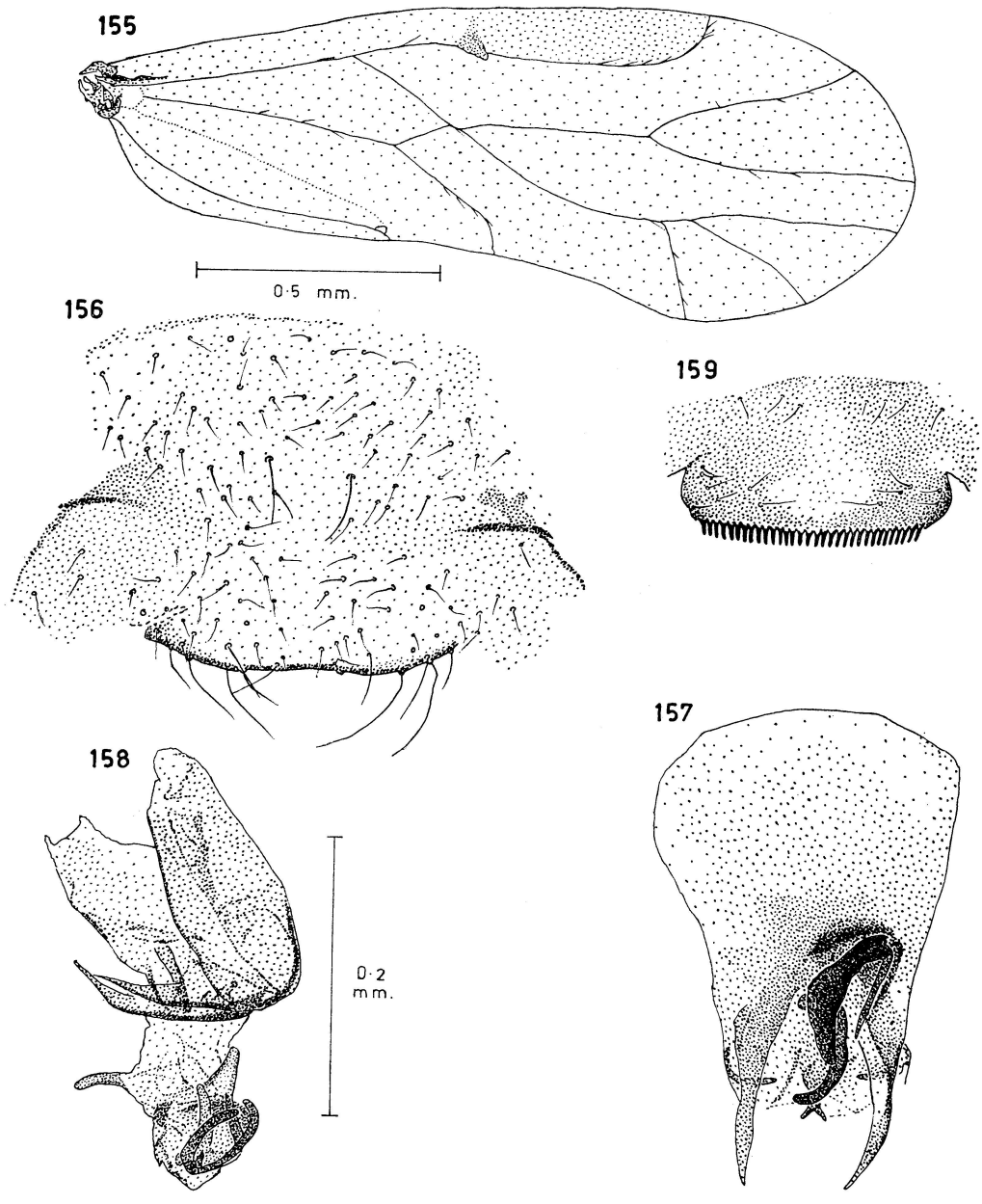


Fig. 155-159. *Ectopsocus dicroglossus* ♂: 155, fore wing; 156, hypandrium; 157, penis frame; 158, penis frame with aedeagal sclerites on eversion; 159, apical abdominal tergite. (All but 155 to common scale.)

DISTRIBUTION: NW New Guinea.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7966) (tube NG28.1, slides 28.1a, b), Wamena, on *Casuarina*, 24.II.1960, Maa; allotype ♂ (tube NG28.2, slides NG28.2a, b) same collecting data.

The male and female genitalia of *E. cristatus* possess certain peculiar features—the presence of pegs on the ventral valve and the strong ridge of sclerotization on tergite 9; otherwise its genitalia are a combination of features characteristic of various groups.

Ectopsocus dicroglossus Thornton and Wong, new species

♂. *Coloration* (after 7 yr in alcohol): Head light buff, usual pattern light brown. Sagittal suture brown. Clypeus with indistinct striae. Maxillary palp cream. Antenna: scape and pedicel light brown, flagellum paler. Ocelli pale. Eyes black. Mesothoracic terga light brown, with a pale spot at center of notum. Metathoracic terga similar. Thoracic pleura buff. Leg: basal segments cream, tibia and tarsal segments very light brown. Fore wing (fig. 155) very light brown; veins light brown. Hind wing paler; veins light brown. Abdomen cream.

Morphology: Fore wing (fig. 155) marginal setae very fine, short, extra row from *sc* to m_1; setae on veins sparse; veins *rs* and *m* fuse for a short length, origins of m_2 and m_3 fairly close. Hind wing with 4 fine, short marginal setae between *r* fork. Hypandrium (fig. 156) simple, some marginal setae very long. Penis frame (fig. 157, 158) broad, lateral margin curved, inner parameres with detached forked median portion, 3 radula sclerites. Tergite 9 (fig. 159) with apical row of 32–42 (2 specimens) small teeth. Metric and meristic characters as in Table 13.

♀. Unknown.

DISTRIBUTION: NW New Guinea

MATERIAL EXAMINED: Holotype ♂ (BISHOP 7967) (tube NG33.1, slides NG33.1a, b), Fak-Fak: Bomberi, NW New Guinea, at light, 6.VI.1959, Gressitt and Maa; paratype ♂ (tube NG3.3, slides NG3.3a, b), Waris, NW New Guinea, at light, 8, 9.VIII.1959, Maa.

E. dicroglossus resembles *E. adelphos* remarkably in male genitalia, differing only in the penis frame not being tubular, and in the detached median portion of the inner parameres being slightly different in shape at the apex. Tergite 9 is of the *perkinsi-basalis* type.

Ectopsocus nidicolus Thornton and Wong, new species

♀. *Colora.ion* (after 4 yr in alcohol): Head light buff, markings hardly discernible. Maxillary palp light buff. Antenna pale brown. Ocelli pale, central margin bordered reddish brown. Eyes black. Mesothorax: light brown, sutures cream, bordered cream. Metathoracic terga similar. Thoracic pleura cream. Leg: basal segments cream, tibia and tarsal segments light brown. Fore wing (fig. 160) very light brown with circular hyaline spots at base of cells R_5, M_3, and Cu_2; middle of cells *R*, Cu_1, Cu_2 and *An*; and semicircular hyaline spots at margin of each marginal cell except pterostigma; darker along vein apices; veins light brown. Hind wing almost hyaline; veins light brown, fading towards apical and posterior margins. Abdomen cream.

Morphology. Fore wing (fig. 160) marginal setae fairly long, extra row from *sc* to r_{4+5}; setae on veins fairly long, sparse; pterostigma slightly broader apically, granulation fine; veins *rs* and *m* meet at a point or are united by a short cross-vein. Hind wing bare; vein r_{2+3} recurved. Subgenital plate (fig. 161) apical lobes triangular with blunt apex each with 2 stout and 1 finer shorter setae, sclerotization at anterior corners. Gonapophyses (fig. 162): ventral valve broadened basally, pointed apically; outer valve short, broad, broadened apically, with 4 stout long apical setae and a field of fine setae in apical 1/2. Paraproct with a median transverse row of 5 long setae and 1 similar seta on mesial margin, and a small double spine on mesial face. Metric and meristic characters as in Table 13.

♂. *Coloration* (after 4 yr in alcohol): As ♀.

Morphology: Hypandrium (fig. 163) simple. Penis frame (fig. 164) inner parameres fused to a broad plate with 2 posterolateral prongs; 4 pointed radula sclerites. Tergite 9 (fig. 165) broad, wider posteriorly, with apical comb of 33–44 (2 specimens) teeth. Metric and meristic characters as in Table 13.

DISTRIBUTION: New Guinea. (Collected from active bird's nest.)

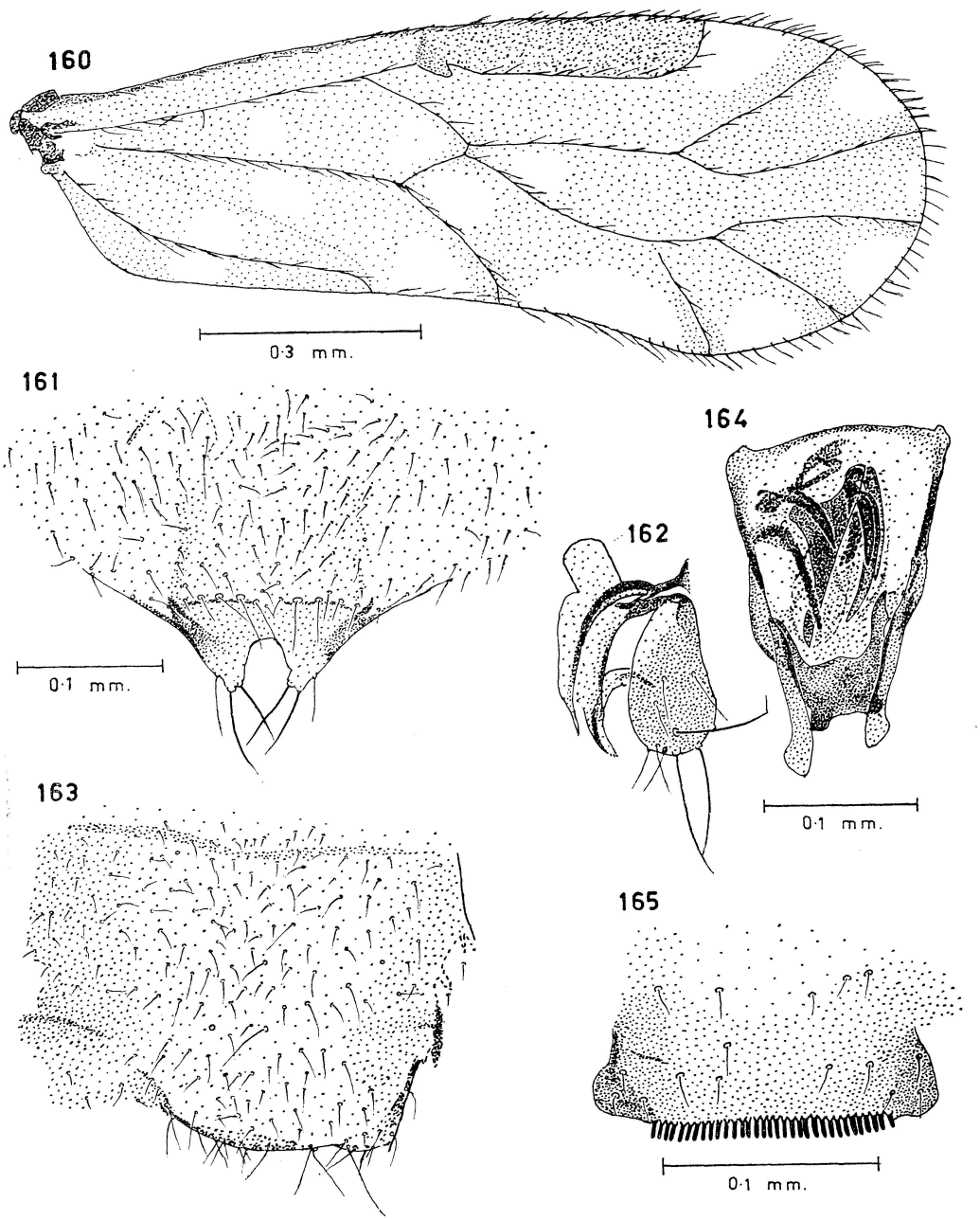


Fig. 160-165. *Ectopsocus nidicolus:* 160, ♂ fore wing; 161, subgenital plate; 162, gonapophyses; 163, hypandrium; 164, penis frame; 165, ♂ apical abdominal tergite. (161, 163 and 162, 164 to common scales.)

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7968) (tube NG45.2, slides NG45.2a, b), BBM-NG, Nabire, NW New Guinea, from bird nest (active), 3.IX.1962, N. Wilson; allotype ♂ (tube NG45.1, slides NG45.1a, b), same collecting data; paratype 1 ♀, same collecting data; 1 ♂, Kassam, E Highlands, NE New Guinea, 1–9.IX.1959, Maa.

The fore wing pattern of *E. nidicolus* is close to that of *E. machadoi* Bad. (Angola), *E. maculatus* Smith (Madagascar), *E. basalis* Banks (Philippines), *E. speciosus* (Philippines, New Guinea, Micronesia), but differs from all in the presence of fewer hyaline spots. The male and female genitalia of *E. nidicolus* and *E. machadoi* differ widely. *E. nidicolus* differs from *E. speciosus* in the sclerotization of the hypandrium, in the form of fusion of the inner parameres and in the number and arrangement of the radula sclerites in the penis frame. The genitalic characters of *E. nidicolus* resemble most closely those of *E. basalis*, but can be distinguished by the presence of 4 radula sclerites in the penis frame, and the outer parameres being broad apically.

Ectopsocus speciosus Thornton and Wong, new species

♀. *Coloration* (after 6 yr in alcohol): Head brown, markings hardly discernible. Setae dark brown. Sagittal suture dark brown. Clypeus with indistinct striae. Anteclypeus pale. Maxillary palp light brown. Antenna light brown. Ocelli pale. Eyes black. Mesothoracic terga brown, a pale spot at center of notum; sutures distinct, brown. Metathoracic terga similar. Thoracic pleura brown. Leg: brown, except trochanter and femoro-tibial joint pale. Fore wing (fig. 166) light brown, darker surrounding vein apices and in apical 3/4 of pterostigma; with small rounded hyaline spots at base of cells R_1, R_5, and M_3, at middle of cells R, R_5, M_3, Cu_1, Cu_2, and An, and at apex of cell R and marginal cells; veins brown. Hind wing light brown; veins brown. Abdomen cream.

Morphology: Fore wing (fig. 166) short, broad, apex rounded; marginal setae fairly long, extra row from *sc* to r_{4+5}; setae on veins fairly long, sparse; veins *rs* and *m* meet at a point or are united by a short cross-vein. Hind wing bare, vein r_{2+3} recurved. Subgenital plate (fig. 167) apical lobes triangula rwith blunt apices, each with 2 stout and 1 finer shorter apical seta; sclerotization at anterior corners. Sclerotization on main plate as 2 oval areas. A row of 8 (not 6) large subapical setae on main plate. Gonapophyses (fig. 168): ventral valve narrow, tapering; outer valve broadening gradually from base, with 9 long setae in apical 1/2. Paraproct with a median transverse row of 5 long setae and 1 seta near mesial margin, and a very small double spine on mesial face. Metric and meristic characters as in Table 13.

♂. *Coloration* (after 7 yr in alcohol): As ♀.

Morphology: Hypandrium (fig. 169) simple, with complex pattern of sclerotization. Penis frame (fig. 170, 171) inner parameres fused, apically produced into a median knob; 3 large posterior pointed radula sclerites and 2 anterolateral curved rows of about 7 small sclerites each, arrangement symmetrical. Tergite 9 (fig. 172) with apical comb of 46–47 (2 specimens) small teeth. Metric and meristic characters as in Table 13.

DISTRIBUTION: Philippines, New Guinea, Micronesia.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7969) (tube NG28.3, slides NG28.3a, b), Wamena, NW New Guinea; on *Casuarina* 24.II.1960, Maa; allotype ♂ (tube NG3.5, slides NG3.5a, b), Waris, NW New Guinea, at light, 8, 9.VIII.1959, Maa; paratype ♂ (tube NG13.1, slide NG13.1a, b), Waris, New Guinea, at light, 31.VII.1959, Maa.

PHILIPPINES: 1 ♂, Los Banos, on dead rattan and banana leaves, 7.V.1965, Thornton.

MICRONESIA: *CAROLINES: PALAU:* 1 ♀, Ngiwal, Babelthuap I., 20.V.1957, C. W. Sabrosky.

The fore wing pattern of *E. speciosus* is close to that of *E. machadoi* Bad. (Angola), *E. maculatus* Smith. (Madagascar) and *E. nidicolus* (New Guinea) but differs from *E. machadoi* in that the pigmentation is fairly uniform, and in the absence of hyaline spots at the base of cell R_3 (shown in the ♂ wing of *E. machadoi*) and subapically in cell Cu_1, and in the presence of hyaline spots in the middle of

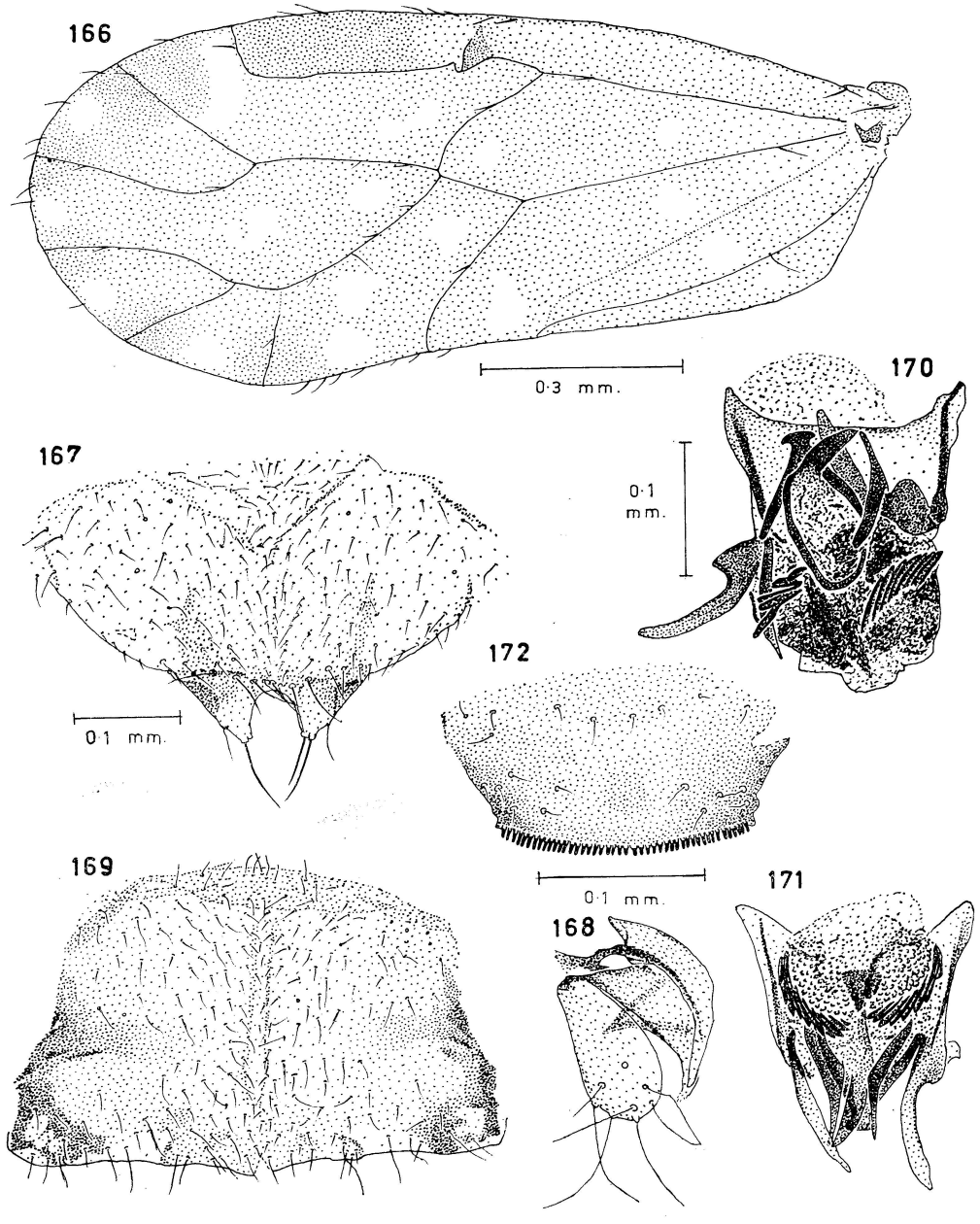


Fig. 166-172. *Ectopsocus speciosus:* 166, ♀ fore wing; 167, subgenital plate; 168, gonapophyses; 169, hypandrium; 170, penis frame with aedeagal sclerites on eversion; 171, penis frame; 172, ♂ apical abdominal tergite. (167, 169 and 168, 170, 171 to common scales.)

cells R_5, and M_3. *E. speciosus* differs from *E. maculatus* in the absence of hyaline spots in the middle of cell Cu_1, subapically in cells *R* (along vein *cu*), R_1, R_3, and R_5, at apex of cell Cu_2, the marginal spot in cell M_5 being double, and in the presence of a spot in the middle of cell *An*. From *E. nidicolus* it differs in that the hyaline spots are smaller, in the presence of hyaline spots near apex of R_1, in the middle of cells R_5 and M_3, and in the relative breadth of the wing. Whereas the female and male genitalic characters of *E. speciosus* are quite different from those of *E. machadoi*, they bear a resemblance to those of *E. nidicolus* differing in the sclerotization of the hypandrium, in the form of fusion of the inner parameres, and in the arrangement of the radula sclerites in the penis frame.

Ectopsocus triangulus Thornton and Wong, new species

♀. *Coloration* (after 6 yr in alcohol): Head light reddish brown, usual pattern indistinct, grayish brown. Sagittal suture dark brown. Clypeus with very indistinct striae, almost indiscernible. Maxillary palp brown, white at joints and apex. Antenna: scape and pedicel brown, rest lost. Ocelli pale. Eyes black. Meso-

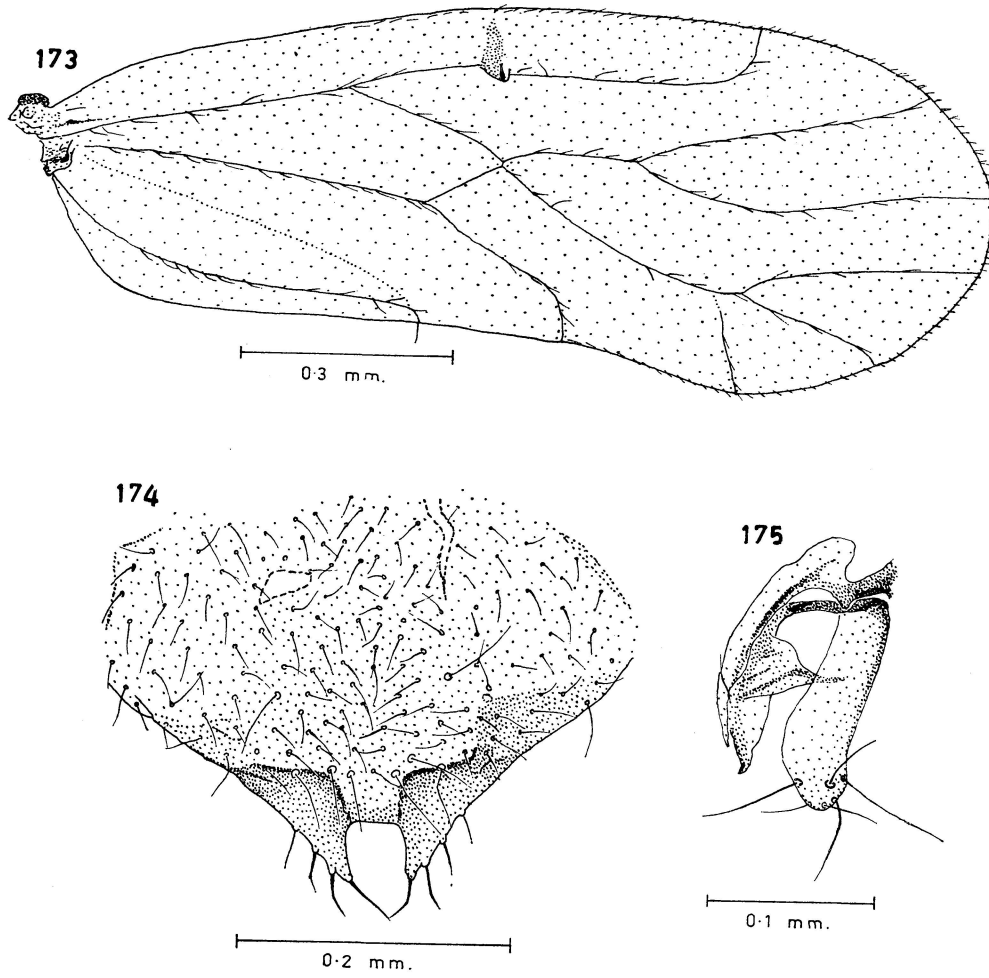


Fig. 173-175. *Ectopsocus triangulus* ♀: 173, fore wing; 174, subgenital plate; 175, gonapophyses.

thorax: light reddish brown, a buff longitudinal line along mid line; sutures indistinct. Metathoracic terga similar. Thoracic pleura light reddish brown. Leg: brown, except trochanter and femur buff. Fore wing (fig. 173) light brown, slightly darker along apices of m_3 and cu_1; veins brown. Hind wing similar. Abdomen buff.

Morphology: Head setae long, sparse. Fore wing (fig. 173) marginal setae short, very fine, extra row from *sc* to r_{4+5}; setae on veins fairly long, sparse; veins *rs* and *m* united by a short cross-vein; radial fork more than 3× as long as stem; origins of m_2 and m_3 close together. Hind wing bare.

Subgenital plate (fig. 174) apical lobes triangular, inner margins parallel, each with 3 stout and 1 fine seta; sclerotization along inner margin continues in a line bent at right angles beyond base. Sclerotization on main plate complete. Gonapophyese (fig. 175): ventral valve narrow; outer valve large, bent subapically laterally, with apical field of 6–8 (2 specimens) setae. Paraproct with a median transverse row of 5 long setae, and a double spine (1 smaller than its fellow) on mesial face. Metric and meristic characters as in Table 12.

♂. Unknown.

DISTRIBUTION: NW New Guinea, Malaya.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7970) (tube NG6.1, slides NG6.1a, b), Eramboe, NW New Guinea, 1, 2.II.1960, Maa.

MALAYA: 1 ♀, Gombak Forest Res., 21 km N of Kuala Lumpur, from porcupine, 29.I. 1963.

E. triangulus resembles closely *E. salpinx* (Malaya, Palawan, Luzon, Micronesia) but differs mainly in subgenital plate sclerotization.

POLYNESIAN SUBREGION

Micronesia

Peripsocus pauliani Badonnel

See p. 20.

Peripsocus suffitus Enderlein

See p. 76.

Table 14. Metric (in mm) and meristic characters of 5 ♀♀ and 5 ♂♂ of *Peripsocus ferrugineus*.

	♀					♂				
B	1.32	1.52	1.46	1.70	1.26	–	1.02	1.32	1.48	1.36
A	0.965	1.020	–	1.045	–	1.230	1.205	–	1.390	1.220
f_1	0.165	0.160	0.200	0.170	0.185	0.165	0.180	0.200	0.205	0.170
f_2	0.130	0.120	0.145	0 105	0 200	0.150	0.145	0.160	0.165	0.145
Ratio f_1/f_2	1.25	1.33	1.36	1.63	0.94	1.09	1.23	1.25	1.24	1.18
Ratio I. O.: D.	2.67	4.00	2.80	2.63	3.50	–	1.56	1.29	1.13	1.88
Fw	1.50	1.48	1.54	1.56	1.48	1.30	1.32	1.40	1.42	1.28
Hw	1.18	1.16	1.20	1.24	1.14	1.04	1.04	1.10	1.10	1.00
Hf	0.280	0.260	0.270	0.280	0.265	0.265	0.250	0.265	0.280	0.240
Ht	0.525	0.495	0.510	0.510	0.495	0.485	0.475	0.490	0.530	0.465
t_1	0.140	0.140	0.140	0.140	0.130	0.140	0.140	0.145	0.145	0.125
t_2	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.065
Ratio t_1/t_2	1.91	1.91	1.91	1.91	1.82	1.91	1.91	2.00	2.00	1.90
Ct	11	13	11	11	13	11	12	12	12	12
Tr	18	18	16	17	15	26	26	20	24	23

Peripsocus ferrugineus Thornton and Wong, new species

♀. *Coloration* (after 20 yr in alcohol): Vertex cream, usual pattern grayish brown and with 2 brown dots lateral to ocelli. Sagittal suture fine, dark brown. Frons with a small unmarked area just anterior to ocelli. Clypeus with oblique brown striae leaving a lighter median longitudinal area wider posteriorly. Labrum brown. Gena with ventral 1/2 brown. Maxillary palp uniformly brown with colorless joints. Antenna uniformly brown. Ocelli pale, on black protuberance. Eyes black. Mesothorax with antedorsum brown, a cream line along mid line and posterior margins; dorsal lobes brown with a cream line along posterior margin; scutellum cream. Metathoracic terga similar. Thoracic pleura brown. Leg: brown. Fore wing (fig. 176) light brown, darker at nodulus and along *rs* before fusion with *m*, and hyaline along *rs* and *m* after fusion; veins darker than membrane in pigmented areas, pale in hyaline area. Pterostigma with a large reddish-brown spot in apical 1/3 extending slightly beyond limit of cell, and a small similarly colored spot at stigma-sac. These spots not developed in young specimens. Hind wing almost hyaline, costal cell darker; veins light brown, fading towards apical and posterior margins. Abdomen cream with brown rings. Apical segment brown.

Morphology: Pterostigma of fore wing (fig. 176) granulate, fairly dilated subapically, bluntly angulate. Subgenital plate (fig. 177): median apical lobe short, trapezoid, with setae apically; main plate with a broad, flat V-shaped sclerotization. Gonapophyses (fig. 178): ventral valve tapering to a fine point, void of recurrent setae; dorsal valve broad, with subapical row of 4 setae; outer valve well developed, subrectangular, length exceeds 1/2 that of dorsal valve, covered except basal 1/3 with a small number of long setae. Metric and meristic characters as in Table 14.

♂. *Coloration* (after 20 yr in alcohol): As ♀.

Morphology: Antenna longer and thicker, eyes larger than in ♀. Pterostigma as in ♀. Hypandrium (fig. 179) simple, setose. Genitalia: penis frame (fig. 180) closed anteriorly, sides subparallel, anterior end square, posterior end rounded, not produced to a beak. Median radula sclerite broad, spatulate, lateral sclerites double. Abdominal tergite 9 with a broad apical lobe bearing 7–11 (5 specimens) small pointed teeth (fig. 181). Metric and meristic characters as in Table 14.

DISTRIBUTION: Micronesia, Fiji, Samoa, and Hawaii.

MATERIAL EXAMINED: Holotype ♀ (CM) (tube M234, slides M234a, b), Achugan, Saipan, S. Marianas, Micronesia, 16.XII.1944, Dybas; allotype ♂ (tube M210, slides M210a, b), As Mahetog area Saipan, S. Marianas, Micronesia, 3.XII.1944, Dybas; paratype 1 ♀, same collecting data as allotype.

MICRONESIA: *S. MARIANAS:* collected by Dybas unless otherwise stated. *SAIPAN:* 2 ♂♂, Laulau Bay area, 25.XI.1944; 1 ♂, same loc., beating vegetation, 3.XII.1944; 3 ♀♀, 2 ♂♂, Halaichai, As Teo area, 8.I.1945; 1 ♀, same loc., 7.II.1945; 1 ♀, Mt. Tagpochau, 1 m NNE of summit, beating vegetation, 10.I.1945; 1 ♀, 1 ♂, Papago area, beating vegetation, 17.I.1945; 1 ♀, same collecting data, 18.I.1945; 10 ♀♀, 7 ♂♂, As Mahetog area, 19.I.1945; 10 ♀♀, 15 ♂♂, same loc. 26.I.1945; 1 ♀, Mt. Tagpochau, 380m, 18.II.1945; 1 ♀, 22.VII.1951, R. Bohart. *TINIAN:* 1 ♂, beach cove off Gurgan Point, 16.III.1945. *GUAM:* 1 ♀, 1 ♂, Alifan, IV.1946, Krauss; 1 ♂, Tutujan, 22.XI.1952, Gressitt; 1 ♀, Mt. Lamlam, X.1957, Krauss; 1 ♂, same collecting data, II.1958, Krauss. *CAROLINES: TOBI:* 2 ♀♀, 2 ♂♂, 12.IX.1952 Krauss. *YAP:* 2 ♀♀, Yap Group, X.1952, Krauss; 1 ♀, 2 ♂♂, Yap, Hill behind Yap town, 60 m, 26.XI.1952, Gressitt; 2 ♀♀, Mt. Matade, 60 m, 2.XII.1952, Gressitt. *WOLEAI:* 1 ♂, Utagal I., 28.IX.1952, Krauss. *IFALIK:* 1 ♂, Ifalik I., 25.IX.1952, Krauss. *TRUK:* 1 ♂, Fefan I., Mt. Iron, 180 m, 31.I.1953, Gressitt. *PONAPE:* 1 ♀, 17.VII.1950, P. A. Adams; 1 ♂, Jokaj, 2 m, 29.I.1953, Gressitt; 1 ♀, 17.VII.1950, Adams. *KUSAIE:* 1 ♀, Mutenlik, 16.VIII.1963, Clarke. *KAPINGAMARANGI:* 1 ♀, Matiro, 4.VIII.1946.

FIJI: 1 ♂, Bavatu, 60–75 m, Vanua Mbalavu, 16.VIII.1938, E. C. Zimmerman.

SAMOA: 1 ♀, Apia, Upolu, 11.II.1940, Zimmerman.

HAWAII: See Thornton (in press).

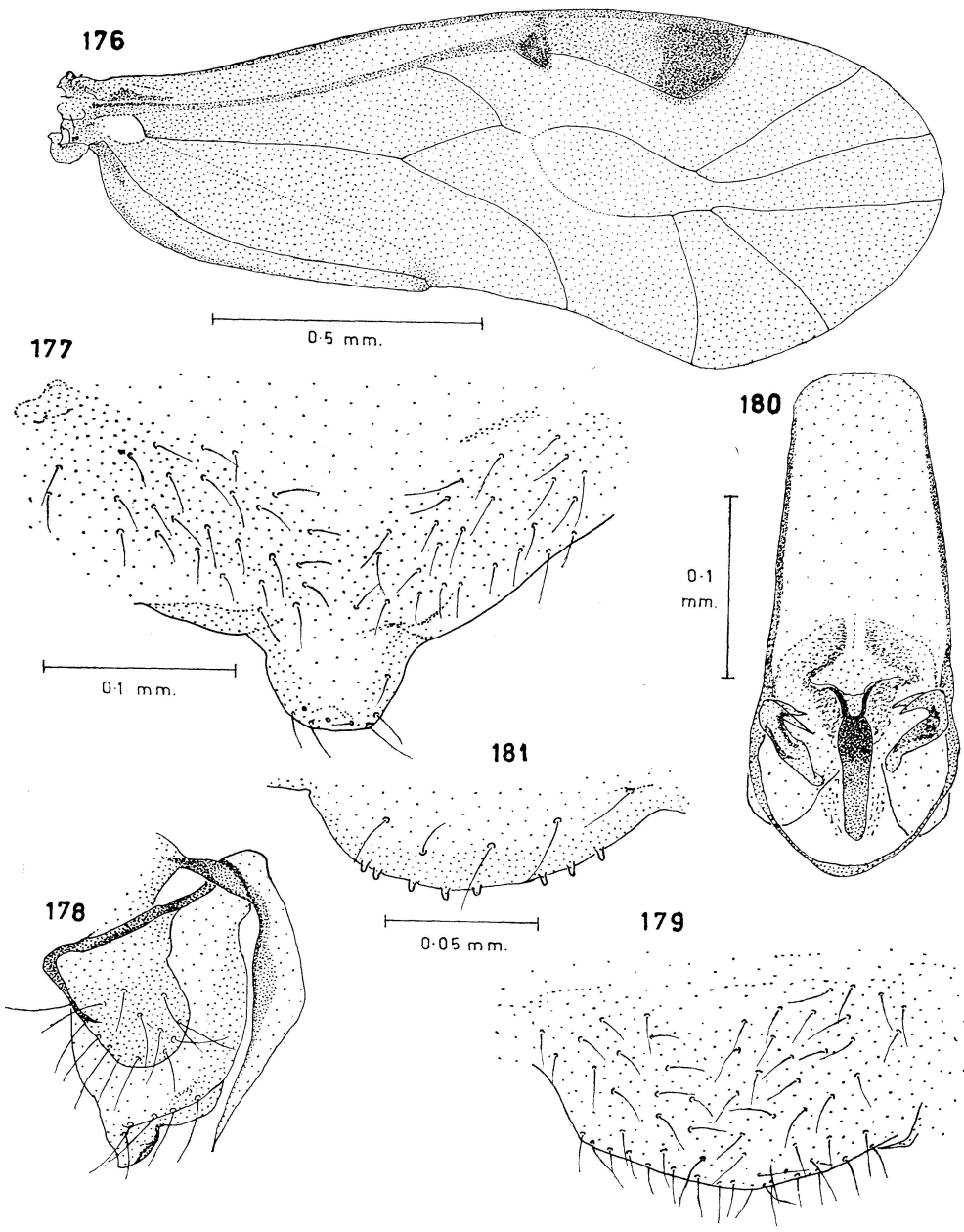


Fig. 176-181. *Peripsocus ferrugineus:* 176, ♀ fore wing; 177, subgenital plate; 178, gonapophyses; 179, hypandrium; 180, penis frame; 181 ♂ caudal comb. (177, 178, 179 to common scale.)

This species is similar to *P. maoricus* (Tillyard) (New Zealand) in wing pattern, but differs from it in the color of the patches and in the absence of the cloudy area in the center of the wing. The 2 species differ further in head pattern, thoracic and abdominal color, and in the ratio of antennal length to fore wing length. *P. ferrugineus* is much smaller, fore wing length being about 1/2 that of *P. maoricus*.

The male of *P. ferrugineus* can easily be distinguished from other peripsocids by the absence of an apical beak on the penis frame, and the shape of the median aedeagal sclerite; both can be seen in the intact insect.

Ectopsocopsis cryptomeriae Enderlein

See p. 26.

Ectopsocus briggsi McLachlan

Ectopsocus briggsi McLachlan, 1899, Ent. Mon. Mag. **35:** 234 (England; distribution).— Guermonprez, 1902, Ent. Mon. Mag. **38:** 288 (Bognor; distribution).— McLachlan, 1903, Ent. Mon. Mag. **39:** 296–97 (Habitat).— Enderlein, 1903b, Ann. Hist. Nat. Mus. Hung. **1:** 294 (Australia; distribution).— King & Halbert, 1910, Proc. R. Irish. Acad. **28**(B): (distribution).— Britten, 1916, Ent. Mon. Mag. **52:** 43 (On wing).— Chapman, 1916, Entomologist, **49:** 62–63.— Harrison, 1916, Entomologist **49:** 134–35 (distribution).— Ball, 1920, Ann. Soc. Ent. Belg. **60:** 178 (Belgium; distribution).— Pearman, 1925, Rep. Bristol Nat. Soc. **6**(3): 228, fig. 1–12; 1928, **64:** 209–18, 239–43, 263–68 (Eggs laid bare, eggs in cement).— Brown, 1928, Ent. Mon. Mag. **64:** 15 (England; distribution).— Badonnel, 1931b, Ann. Sci. Nat. (Zool.) 10, **14**(2): 229–60 (Mozam.); 1931a, Bull. Soc. Zool. Fr. **56:** 341–47 (E. Pyrenees; distribution).— Gambles, 1932, *In*: The Natural History of Wicken Fen **6:** 569–79 (England; distribution).— Roesler, 1935a, Arch. Ver. Naturg. Mecklenb. **9**(1934): 26 (distribution); 1935b, Zool. Anz. **111:** 93–95 (fig.).— Weber, 1936, *In* Schulze, P. (1936) Biol. Tiere Dtschl. **39**(27): 1–50, fig. 1–27 (distribution).— Badonnel, 1936, Mem. Mus. Hist. Nat. Paris **4:** 155 (=*californicus* Banks; distribution).— Jentsch, 1939, Zool. Jahrb. **73:** 126 (compared with *meridionalis*, fig. int. and ext.).— Kimmins, 1941, J. Soc. Brit. Ent. **2**(3): 93–98 (distribution).— Söfner, 1941, Zool. Jahrb Abt. Syst. **74:** 323–60 (developmental biology).— Badonnel, 1943b, Faune Fr. **42:** 99 (further description).— Ball, 1943, Bull. Mus. Hist. Nat. Belg. **19**(38): 8 (distribution) Badonnel, 1944, Rev. Fr. Ent. Paris **11:** 57 (further description).— Daltry, 1929, Trans. N. Staff. Fld. Cl. **63:** 89.— Danks, 1950, Goz. Muzei Prirdy Riga L.S.S.R. **2:** 3 (distribution).— Neves, 1952, Bol. Soc. Portug. Cienc. Nat. **4:** 10 (distribution).— Danks, 1955, Ent. Obozr. **34:** 181 (distribution); 1958, Bull. Biol. Ins. Sci. Acad. L.S.S.R. **5:** 123 (distribution); 1959, Ent. Sbornik J. In-t Zool. Bot. A.N. Estonskoj S.S.R. **1:** 147–55 (distribution).— Mockford, 1959, Proc. Ent. Soc. Wash. **61**(6): 260–66 fig. 1–8 (U. S. A.; distribution).— Smithers, 1960, J. Ent. Soc. S. Afr. **23**(1): 221 (distribution).— Badonnel, 1963, Biol. Amer. Austral. **2:** 335 (distribution).— Thornton, 1964, Pacif. Ins. **6**(2): 287 (in air).

Ectopsocus briggsi meridionalis Ribaga, 1904, Redia **1:** 294–98 (distribution).— Badonnel, 1943, Bull. Soc. Ent. Fr. **48:** 100 (distribution).

DISTRIBUTION: Marianas, New Zealand, also widespread.

MATERIAL EXAMINED: MICRONESIA: *S. MARIANAS:* 1 ♂, Saipan, 7.V.1945, Dybas.

NEW ZEALAND: collected by C. W. O'Brien unless otherwise stated. 1 ♀, Balance Bridge, 19.2 km NE of Palmerston, 28.III.1960; 3 ♂♂, Ngnongotaha Mt., Rotonia, Auckland, 1.IV.1960; 3 ♀♀, Lake Oka Taimar, 28 km E of Rotorua, 2.IV.1960; 2 ♀♀, East Bourne, Butterfly Track, Wellington, 17.II.1962.

Ectopsocus fullawayi Enderlein

See p. 132.

Ectopsocus hawaiiensis Enderlein

See p. 134.

Ectopsocus maindroni Badonnel

See p. 13.

Ectopsocus pumilis (Banks)

See p. 14.

Ectopsocus waterstradti (Enderlein)

See p. 59.

Ectopsocus boharti Thornton and Wong new species,

♀. *Coloration* (after 15 yr in alcohol): Head lost. Thorax cream. Leg cream. Fore wing (fig. 182) almost hyaline, slightly tinted along apex of m_2, m_3 and cu_1; veins light brown. Hind wing almost hyaline; veins light brown. Abdomen cream.

Morphology: Fore wing (fig. 182) marginal setae long, extra row from *sc* to m_1; setae on veins long, very sparse; pterostigma finely granulated; veins *rs* and *m* united by a short cross-vein; *r* fork wide, *m* displaced towards posterior margin. Hind wing with 11 marginal setae between *r* fork. Subgenital plate (fig. 183) apical lobe ill-defined, median, incipiently bi-lobed; 8 apical setae; sclerotization at anterior corners. Main plate with 4 (not 6) large subapical setae, sclerotization in 2 ovoid areas. Gonapophyses (fig. 184): ventral valve very broad and rounded basally, tapering apically; outer valve slightly broadened subapically, slightly curved laterally, with a field of 4 long and 3 short setae in apical 1/3. Paraproct with a median transverse row of 4 long setae, and a very small double spine on mesial face. Metric and meristic characters as in Table 17.

♂. Unknown.

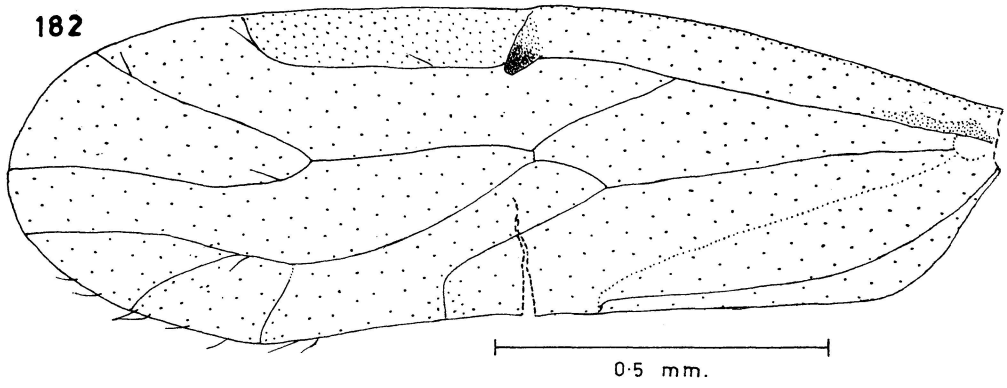
DISTRIBUTION: Micronesia.

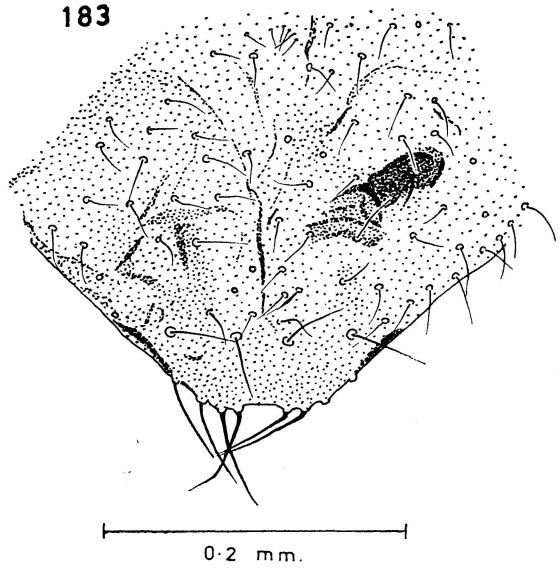
MATERIAL EXAMINED: Holotype ♀ (US 69634) (tube M12, slides M12a, b), Chichi Jima, Bonins, Micronesia, 10.VII.1951, Bohart.

The female genitalia of *E. boharti* resemble remarkably those of *E. hirsutus* Th. (Hong Kong), differing in the absence of sclerotization of subgenital plate lining, and the absence of sclerotized structures associated with the spermathecal duct. The fore wing of *E. boharti* is relatively longer and narrower, and the setae finer than in *E. hirsutus*. Furthermore, the distribution of hind wing marginal setae is more restricted, setae being present between the *r* fork only.

Table 15. Metric (in mm) and meristic characters of 5 ♀♀ and 5 ♂♂ of *Ectopsocus denervus*.

	♀					♂				
B	1.64	1.58	1.44	1.64	1.42	1.14	1.00	1.26	1.40	1.04
A	1.000	0.965	0.875	0.960	0.960	1.125	1.060	–	1.045	1.150
f_1	0.210	0.220	0.200	0.205	0.210	0.230	0.225	0.230	0.220	0.270
f_2	0.120	0.120	0.115	0.115	0.105	0.130	0.125	0.130	0.125	0.145
Ratio f_1/f_2	1.78	2.02	1.77	1.82	2.00	1.75	1.79	1.75	1.74	1.91
Ratio I. O.: D.	4.73	5.00	5.47	5.20	5.47	2.22	2.50	2.22	2.67	2.10
Fw	1.28	1.32	1.24	1.26	1.26	1.30	1.22	–	1.18	1.28
Hw	1.06	1.08	1.02	1.00	1.02	1.08	0.98	1.00	0.96	1.04
Hf	0.330	0.320	0.305	0.305	0.320	0.320	0.320	0.305	0.290	0.330
Ht	0.490	0.485	0.450	0.455	0.465	0.485	0.465	0.450	0.430	0.505
t_1	0.125	0.140	0.125	0.130	0.125	0.125	0.130	0.130	0.120	0.130
t_2	0.075	0.075	0.065	0.075	0.075	0.075	0.075	0.075	0.075	0.080
Ratio t_1/t_2	1.73	1.91	1.90	1.82	1.73	1.73	1.82	1.76	1.64	1.67
Ct	6	6	4	4	5	1	7	6	6	7
Tr	8	8	8	8	8	8	8	8	8	8





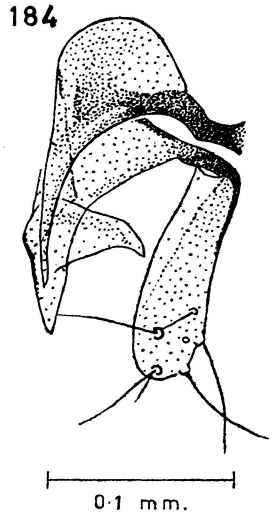


Fig. 182-184. *Ectopsocus boharti* ♀: 182, fore wing; 183, subgenital plate; 184, gonapophyses.

Ectopsocus denervus Thornton and Wong, new species

♀. *Coloration* (after 22 yr in alcohol): Head light buff, usual pattern very faint light grayish brown. Maxillary palp light buff. Antenna light brown, fading towards apex. Ocelli pale. Eyes black. Thorax light buff, with brown longitudinal line laterally. Leg: basal segments cream, tibia and tarsal segments very light brown. Fore wing (fig. 185) almost hyaline, veins light brown. Hind wing similar. Abdomen cream, with brown longitudinal line laterally in continuity with that of thorax.

Morphology: Setae on head long, sparse. Fore wing (fig. 185) marginal setae very fine, very short; setae on veins fairly long, sparse; pterostigma granulation fine, apex smoothly rounded; veins *rs* and *m* meet at a point or fuse for a short length. Hind wing (fig. 186) with 2–4 (10 specimens) fairly long marginal setae anterior to r_{4+5}; vein r_{2+3} absent. Subgenital plate (fig. 187) apical lobes rounded, each with a stout seta apically and a finer one on either side of it; sclerotization complete extending into main plate at anterior cor-

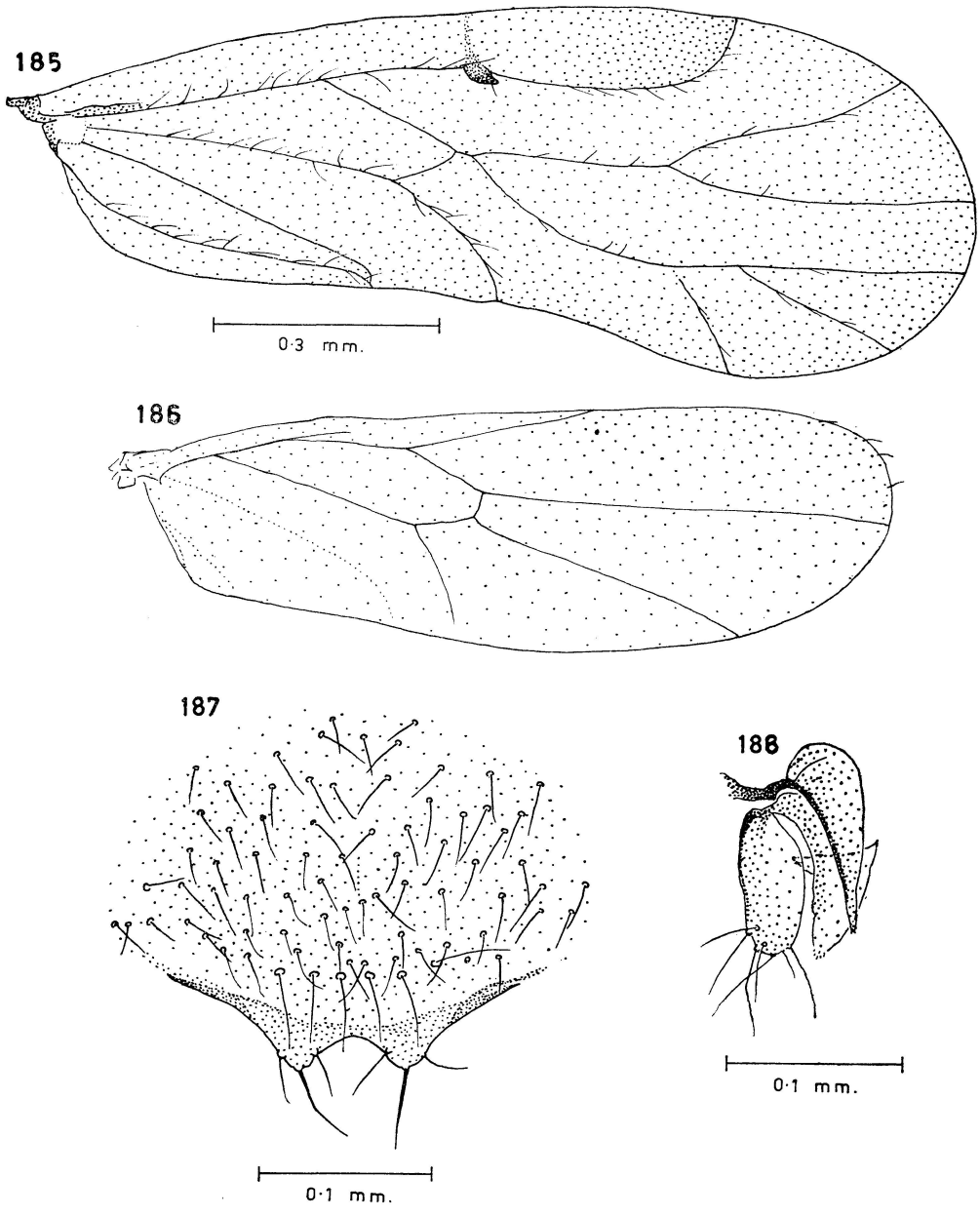


Fig. 185-188. *Ectopsocus denervus:* 185, ♂ fore wing; 186, ♂ hind wing; 187, subgenital plate; 188, gonapophyses. (185, 186 to common scale.)

ners. Sclerotization on main plate as 2 ovoid areas, setae long. Gonapophyses (fig. 188): ventral valve broad and rounded basally, tapering apically; outer valve short, broad, with apical field of 5–7 long setae. Paraproct with a median transverse row of 5 long setae, and a small single spine on mesial face. Metric and meristic characters as in Table 15.

♂. *Coloration* (after 11 yr dry storage, restored in alcohol): As ♀.

Morphology: Antenna thicker than that of ♀. Hypandrium simple, setose (fig. 189). Penis frame (fig. 190) inner parameres fused to a broad plate with small lateral peg directed posteriorly. Radula sclerites

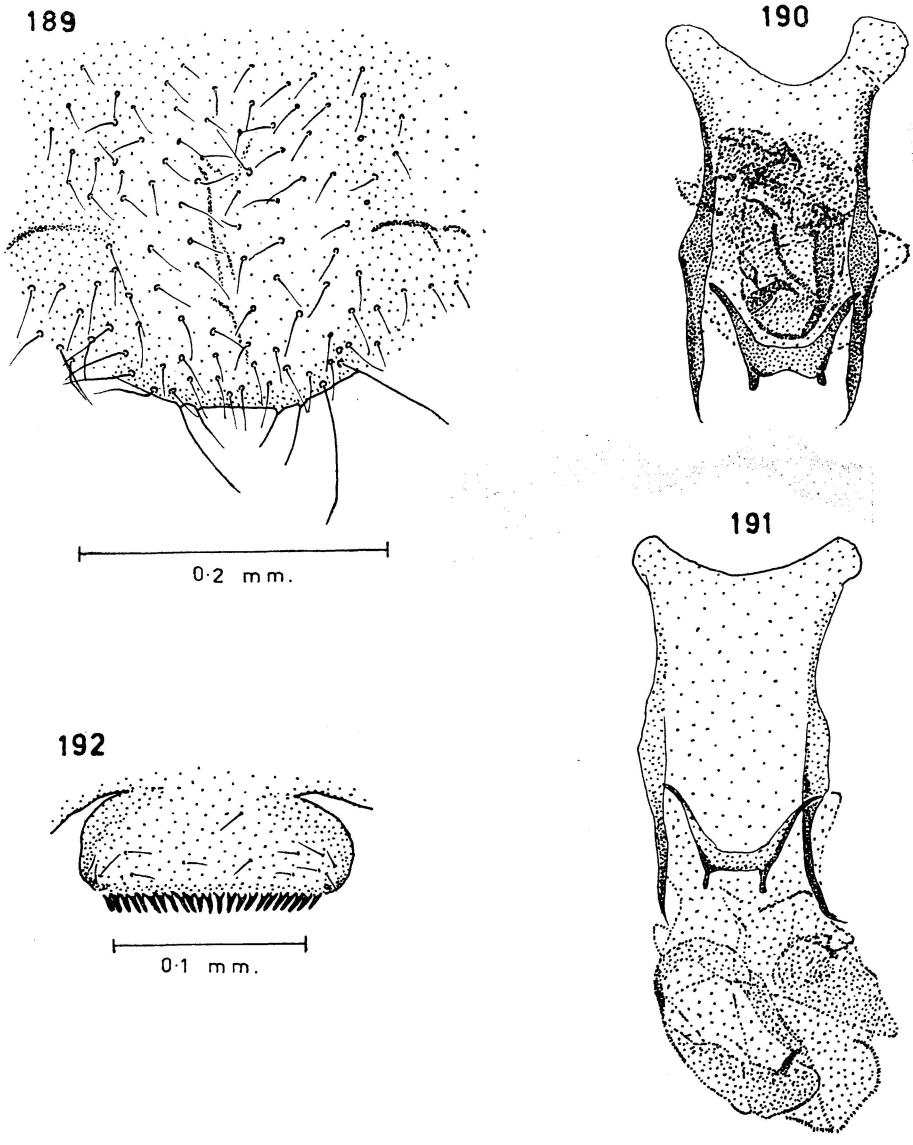


Fig. 189-192. *Ectopsocus denervus:* 189, hypandrium; 190, penis frame; 191, penis frame with ejcaulatory bulb on eversion; 192, ♂ apical abdominal tergite. (All but 189 to common scale.)

absent. Tergite 9 (fig. 192) broad, with a marginal row of 22–28 (5 specimens) medially directed teeth. Metric and meristic characters as in Table 15.

DISTRIBUTION: Philippines, Micronesia, Samoa.

MATERIAL EXAMINED: Holotype ♀ (CM) (tube M235, slides M235a, b), Achugau, Saipan, S. Marianas, 16.XII.1944, Dybas; allotype ♂ (tube M95, slides M95a, b), Koror, 25 m, Palau I., Carolines, at light, 18.XII.1952, Gressitt; paratype ♂ (tube M164, slides M164a, b), As Mahetog area, Saipan, 20.I.1945, Dybas; other paratypes 7 ♀♀, 2 ♂♂, (CM, BISHOP, USNM), same collecting data.

MICRONESIA: *S. MARIANAS: SAIPAN:* 2 ♀♀, As Mahetog area, 19.I.1945, Dybas. *GUAM:* 6 ♀♀, 1 ♂, Amantes Point, beating vegetation, 27.V.1945, Dybas. *CAROLINES: PALAU:* 1♀, Babelthuap, Ngiwal, at light, 19.V.1957, Sabrosky; 1♀, same collecting data, 20.V. 1957, C. W. Sabrosky. *YAP I.:* 1 ♀, Gagil district, 19.VII.1952, Goss; 4 ♂♂, Weloy Dugor, at light, 20.VI.1957, Sabrosky. *TRUK:* 1♂, Moen I., Mt. Teroken, 80 m, light trap, 28.XII.1952, Gressitt. 1 ♀, 1 ♂, 30 m, otherwise same collecting data, 6.II.1953, Gressitt. *PONAPE:* 1 ♂, Colonia, 16 m, Agr. Exp. Sta., light trap, 15.I.1953, Gressitt; 1 ♀, 1 ♂, same collecting data, 7.II.1953, Gressitt; *KUSAIE:* 1 ♀, Matunluk (Yepan), Pac. Sci. Bd., 23.I.1953, Gressitt; 2 ♂♂, Hill 1010, 300 m, light trap, 13.IV.1953, Clarke; 2 ♀♀, Malem R., 90 m, 27.IV.1957, Clarke. *GILBERTS: BUTARITARI ATOLL:* 1 ♀, 3 ♂♂, Butaritari I. XII.1957, N. Krauss.

PHILIPPINES: *LUZON:* 1 ♀, Los Banos, dead rattan and banana leaves, 7.V.1965, Thornton.

SAMOA: 1 ♂, Apia, Upolu, 2.VI.1940, Zimmerman; 1 ♀, 2 ♂♂, Naval Station, Tutuila, 16.VIII.1940, Zimmerman & O. H. Swezey.

The female genitalia of *E. denervus* resemble remarkably those of *E. vachoni* Bad. (Africa, N. & S. America) (=*E. dimorphus* Mockford & Gurney) but differs in male genitalia and in the absence of vein r_{2+3} in the hind wing. This vein is lacking in all specimens (48) examined.

Ectopsocus fenestratus Thornton and Wong, new species

♀. *Coloration* (after 21 yr in alcohol): Head cream, usual pattern very light grayish brown. Clypeus with very light brown oblique striae. Maxillary palp cream. Antenna: scape and pedicel very light brown, 2 basal flagellar segments pale, rest very light brown. Ocelli pale. Eyes black. Mesothoracic terga buff, posterior suture brown. Metathoracic terga similar. Thoracic pleura light brown. Leg: coxa light brown, trochanter and femur cream, tibia and tarsal segments very light brown. Fore wing (fig. 193) light brown; darker at vein apices; lighter at wing base, in basal 1/2 of pterostigma, in cell *An* and along veins except at *rs-m* junction and vein apices; hyaline in costal cell, at base of cells *R*, R_3, R_5, and Cu_1, in the middle of cells *R*, R_1, Cu_1, and Cu_2, and at margin of marginal cells; veins light brown. Hind wing almost hyaline; veins light brown. Hind wing bare. Abdomen cream with diffuse dark brown pigmentation.

Morphology: Fore wing (fig. 193) marginal setae fairly long, extra row from *sc* to r_{4+5}; setae on veins fairly long, sparse; pterostigma broader subapically, apex smoothly rounded; veins *rs* and *m* fuse for a length. Subgenital plate (fig. 194) apical lobes triangular with inner margins slightly convergent, each lobe bearing 3 stouter and 2 fine setae on outer margin; sclerotization as double oblique lines at anterior corners. Sclerotization on main plate as 2 ovoid areas. Gonapophyses (fig. 195): ventral valve tapering apically; outer valve broader apically with apical field of 6 long and 4 short setae. Paraproct with a median transverse row of 6 long setae and a very small double spine on mesial face. Metric and meristic characters as in Table 16.

♂. *Coloration* (after 21 yr in alcohol): As ♀.

Morphology: Hypandrium (fig. 196) simple. Penis frame (fig. 197, 198) inner parameres fused to a median keel-like knob; outer parameres not sclerotized, apices rounded; an anterior triangular radula sclerite with rounded projection, and a posterior triradiate radula sclerite with hooked apex and 1 longer posterior arm.

Tergite 9 (fig. 199) long, with apical comb of 20–31 (5 specimens) small teeth, and 2 groups of tubercles

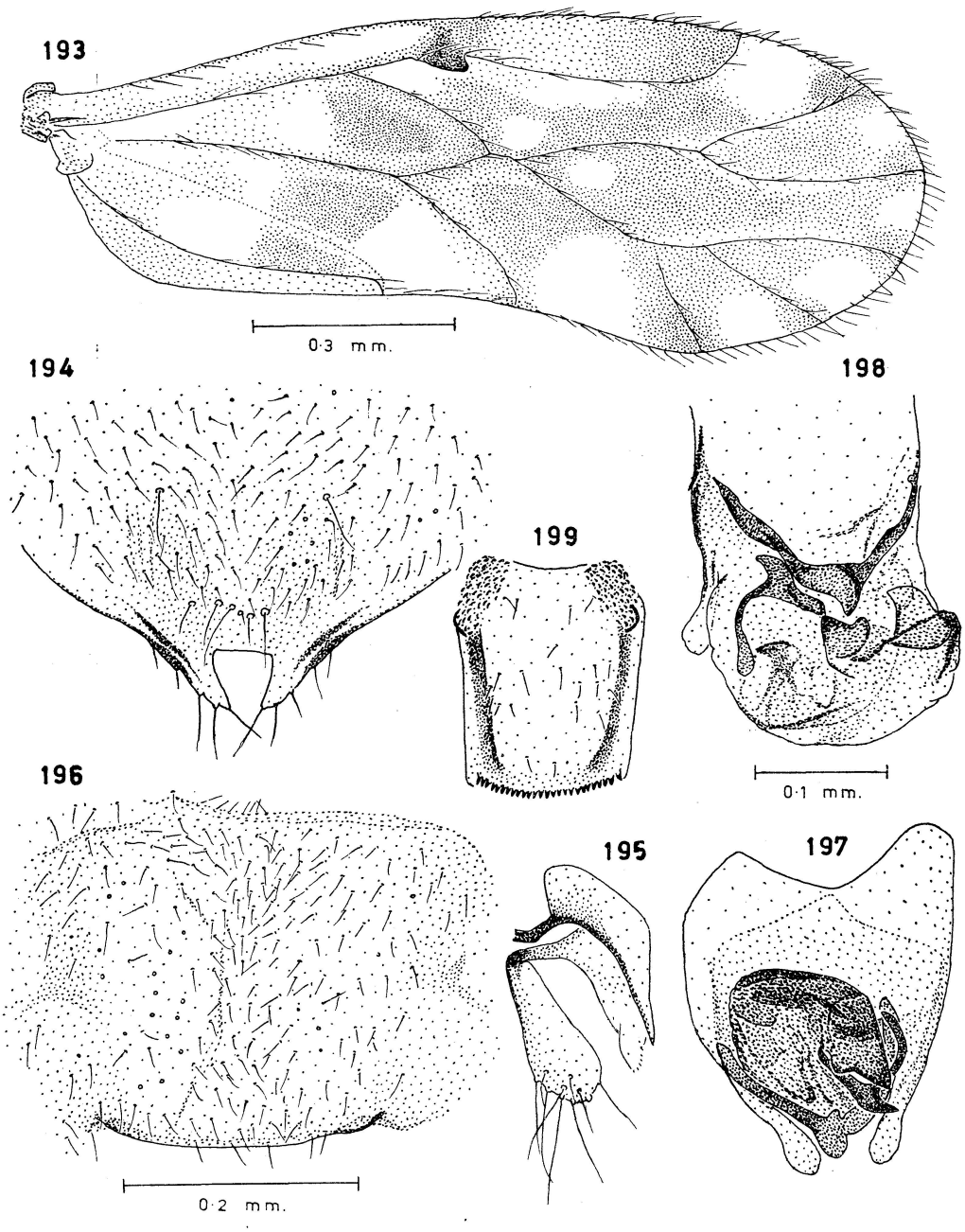


Fig. 193-199. *Ectopsocus fenestratus*: 193, ♂ fore wing; 194, subgenital plate; 195, gonapophyses; 196, hypandrium; 197, penis frame; 198, penis frame with aedeagal sclerites on eversion; 199, ♂ apical abdominal tergite. (194, 195, 197, 198, 199 to common scale.)

Table 16. Metric (in mm) and meristic characters of 5 ♀♀ and 5 ♂♂ of *Ectopsocus fenestratus*.

	♀					♂				
B	1.46	1.64	1.58	1.62	1.38	1.38	1.64	1.32	1.30	1.44
A	1.105	1.115	1.105	1.120	1.075	1.275	1.300	1.165	1.230	1.240
f_1	0.230	0.245	0.225	0.230	0.225	0.250	0.260	0.230	0.250	0.250
f_2	0.150	0.150	0.150	0.150	0.145	0.170	0.170	0.145	0.160	0.165
Ratio f_1/f_2	1.52	1.61	1.48	1.52	1.54	1.47	1.50	1.57	1.58	1.50
Ratio I. O.: D.	4.55	4.48	4.55	4.33	4.49	3.66	3.46	3.89	3.71	3.69
Fw	1.26	1.28	1.24	1.36	1.24	1.22	1.28	1.20	1.26	1.28
Hw	1.08	1.08	1.02	1.14	1.02	1.02	1.04	0.98	1.04	1.02
Hf	0.330	0.345	0.330	0.355	0.320	0.305	0.320	0.300	0.310	0.330
Ht	0.550	0.555	0.530	0.570	0.515	0.510	0.515	0.490	0.505	0.555
t_1	0.205	0.200	0.200	0.210	0.185	0.200	0.210	0.200	0.200	0.225
t_2	0.080	0.080	0.080	0.085	0.080	0.080	0.085	0.075	0.075	0.085
Ratio t_1/t_2	2.58	2.50	2.50	2.46	2.34	2.50	2.46	2.59	2.72	2.62
Ct	13	13	14	13	15	17	14	14	14	16
Tr	8	8	8	8	8	8	8	8	8	8

anterolaterally, lateral longitudinal band of sclerotization. Metric and meristic characters as in Table 16.

DISTRIBUTION: Micronesia.

MATERIAL EXAMINED: Holotype ♀ (CM) (tube M200, slides M200a, b), Kalabera area, Saipan, S. Marianas, Micronesia, beating vegetation, 28.I.1945, Dybas; allotype ♂ (tube M198, slides M198a, b), same collecting data; paratypes 3 ♀♀, 1 ♂, same collecting data; paratype ♂ (tube M303, slides M303a, b), As Mahetog area, Saipan, S. Marianas, Micronesia, 25.XII.1944, Dybas.

MICRONESIA: *S. MARIANAS: SAIPAN:* collected by Dybas unless otherwise stated. 1 ♀, Donni-sados Tasi, 7.V.1940, Yasumatsu & Yoshimura; 1 ♂, As Mahetog area, 25.XII.1944; 1 ♀, same data, 19.I.1945; 1 ♀, 2 ♂♂, same data, 20.I.1945; 2 ♂♂, Halaihai, As Tco area, 8.I. 1945; 1 ♀, Papago area, 18.I.1945; 1 ♀, hills E of Garapan, 23.I.1945; 2 ♀♀, 2 ♂♂, Talofofo ridge, 23.I.1945; 2 ♀♀, 7 ♂♂, Chalau Laulau area, 24.I.1945; 1 ♂, near Lake Susupe, 1.II.1945; 2 ♀♀, 2 ♂♂, Kalabero area, 16.II.1945; 1 ♀, 17.III.1945; 1 ♂, Kolder Field, II.1958, Krauss *TINIAN:* collected by Dybas: 1 ♀, 3 km NE of Tinian Harbor, 16.III.1945; 2 ♂♂, Tinian Harbor, 20.III.1945; 2 ♀♀, 3 ♂♂, ridge SE section, 27.III.1945; 2 ♀♀, 1 ♂, NW slope of Mt. Lasso, 4.IV.1945; 1 ♀, ridge 1 km N of Tinian Harbor, sweeping at base of *Pandanus*, 10.IV.1945, Dybas; 1 ♀, 1–14.IV.1945; 3 ♀♀, 16–30.IV.1945. *GUAM:* 1 ♀, Anderson Air Force Base, VIII.1952, Krauss.

E. fenestratus resembles closely *E. erosus* End. (New Guinea) in male genitalic characters, sharing among other characters the keel-like apex of the fused inner parameres. It differs in that the fore wing pattern is less broken up by hyaline spots, in the shape of the anterior radula sclerite, and in the presence of only 2 groups of tubercles on tergite 9.

Ectopsocus marginatus Thornton and Wong, new species

♀. *Coloration* (after 21 yr in alcohol): Head cream, usual pattern faint, very light grayish brown. Striae on clypeus hardly discernible. A brown band from antennal socket to orbit, continuing to posterior margin of head. Maxillary palp cream. Antenna very light brown. Ocelli pale. Eyes black. Mesothoracic and metathoracic terga buff; sutures indistinct. Thoracic pleura cream, a transverse dark brown band continuous with that of head. Leg: coxa, trochanter and femur cream, tibia and tarsal segments light brown.

Table 17. Metric (in mm) and meristic characters of *Ectopsocus boharti* (♀), and 5 ♀♀ and 3 ♂♂ of *E. marginatus*.

	E. boharti	*E. marginatus*							
	♀	♀					♂		
B	–	1.48	1.20	1.58	1.48	1.62	1.18	1.40	1.30
A	–	0.965	0.955	1.005	0.925	0.960	0.995	1.125	1.005
f_1	–	0.180	0.195	0.200	0.180	0.185	0.180	0.210	0.190
f_2	–	0.115	0.120	0.115	0.105	0.115	0.115	0.145	0.120
Ratio f_1/f_2	–	1.59	1.63	1.71	1.69	1.65	1.59	1.45	1.61
Ratio I. O.: D.	–	4.20	4.00	3.66	4.04	3.82	4.20	3.82	3.64
Fw	1.42	1.18	1.26	1.24	1.18	1.18	1.10	1.26	1.20
Hw	1.20	0.94	1.02	1.02	0.96	1.04	0.90	1.02	0.98
Hf	0.360	0.270	0.285	0.285	0.265	0.280	0.260	0.285	0.270
Ht	0.570	0.475	0.500	0.510	0.485	0.505	0.465	0.510	0.595
t_1	0.210	0.170	0.185	0.185	0.170	0.170	0.165	0.180	0.170
t_2	0.065	0.075	0.080	0.080	0.075	0.075	0.065	0.075	0.075
Ratio t_1/t_2	3.20	2.36	2.34	2.34	2.24	2.36	2.50	2.33	2.24
Ct	16	12	13	12	13	11	12	13	13
Tr	8	8	8	8	8	8	8	8	8

Fore wing (fig. 200) light brown, darker at vein apices, hyaline semicircular area at apex of each marginal cell; veins hyaline, bordered hyaline. Hind wing very light brown; veins light brown. Abdomen cream, lateral diffused dark brown band continuous with that of head and thorax.

Morphology: Fore wing (fig. 200) margin with a single row of very short, very fine microscopic setae; *rs* and *m* often meet at a point, but sometimes fuse for a short length or are united by a short cross-vein; setae on veins short. Hind wing with 1–4 (8 specimens) very fine, very short marginal setae between *r* fork. Subgenital plate (fig. 201) apical lobes blunt apically, slightly converging, each with 2 stout apical setae and a finer seta on outer margin. Small median lobe with a median strong seta. Sclerotization on apical lobes at latero-anterior corners, less prominent sclerotization on main plate as 2 large ovoid areas. Gonapophyses (fig. 202): ventral valve slender; outer valve bluntly rounded, with a field of 3 long and 3 finer shorter setae apically. Paraproct with a median transverse row of 4 long setae, and a small double spine on mesial face. Metric and meristic characters as in Table 17.

♂. *Coloration* (after 21 yr in alcohol): As ♀.

Morphology: Hypandrium (fig. 203) with 3 pairs of apical appendages: a very small median pair each with a small apicomesial seta; a very prominent truncate pair; and a lateral small cylindrical pair with a semicircular appendage. Penis frame (fig. 204) inner parameres fused, bow-like, with lateral pegs directing outwards; radula complex not possible to interpret.

Tergite 9 (fig. 205) with apical curved comb of 25–26 (3 spec.) short teeth forming 2 incipient groups. Metric and meristic characters as in Table 17.

DISTRIBUTION: Micronesia.

MATERIAL EXAMINED: Holotype ♀ (CM) (tube M126, slides M126a, b), NW slope of Mt. Lasso, Tinian, S. Marianas, Micronesia, beating vegetation, 25.III.1945, Dybas; allotype ♂ (tube M236, slides M236a, b), Halaihai As Teo area, Saipan, S. Marianas, Micronesia, 7.II.1945, Dybas; paratypes 4 ♀♀, 1 ♂, same collecting data as allotype.

MICRONESIA: *S. MARIANAS:* collected by Dybas unless otherwise stated. *SAIPAN:* 1♂, Laulau Bay area, beating vegetation, 3.XII.1944; 3♀♀, Halaihai, As Teo area, beating vegetation, 4.II.1945. *TINIAN:* 1 ♀, NW slope of Mt. Lasso, 18.III.1945; 1 ♀, same collecting data, 4.IV.1945. *GUAM:* 1♀, 1 ♂, Pago, 9.V.1945; Bohart and Gressitt; 1 ♂, Yigo, II.1958, Krauss.

E. marginatus has a well-marked fore wing pattern very similar to that of *E. spilotus* (Micronesia,

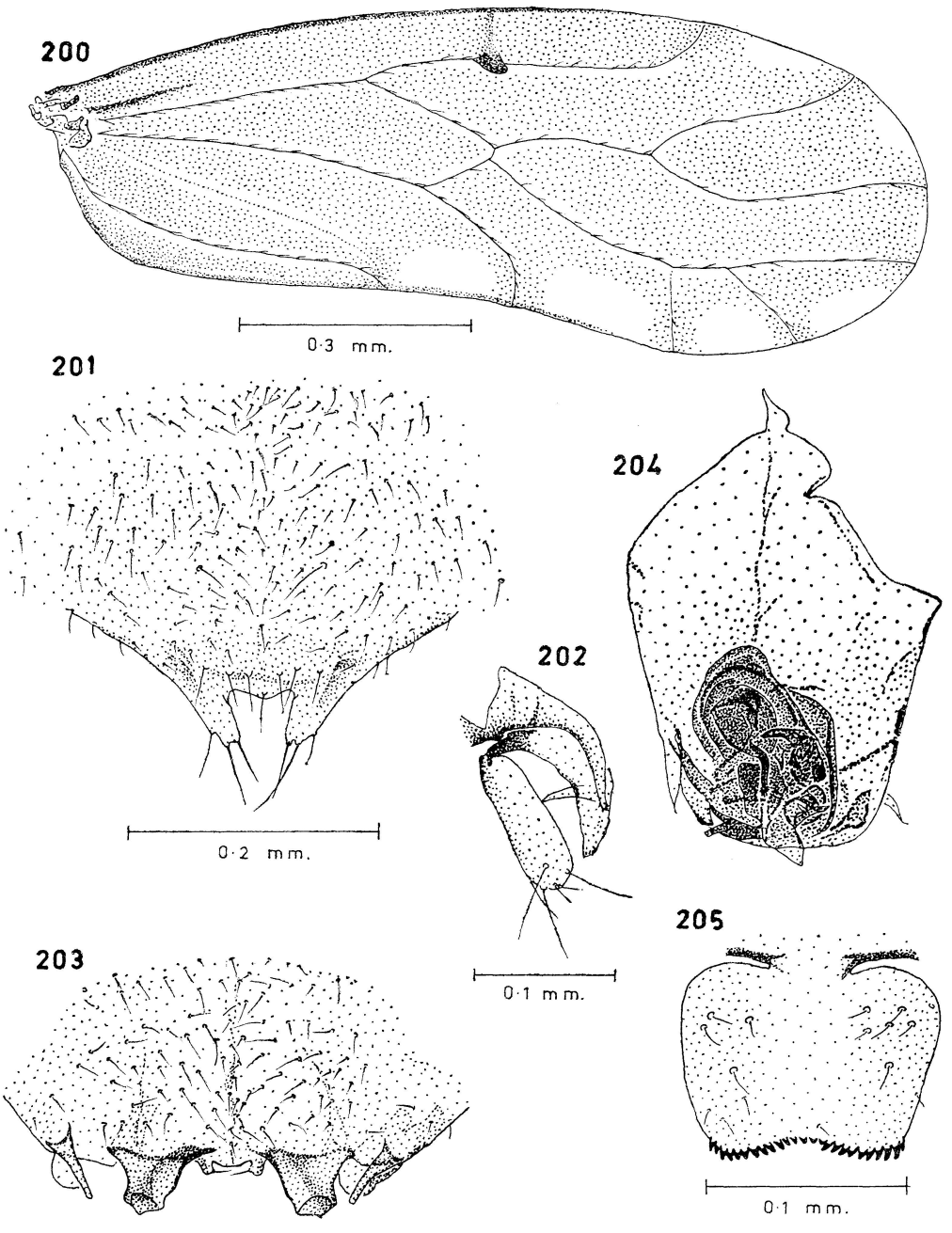


Fig. 200-205. *Ectopsocus marginatus*: 200, ♀ fore wing; 201, subgenital plate; 202, gonapophyses; 203, hypandrium; 204, penis frame; 205, ♂ apical abdominal tergite. (201, 203, 204 to common scale.)

Fiji, Samoa, Hawaii); however, the wing base is not hyaline. Both female and male genitalia resemble those of *E. maindroni* Bad. (widespread) with the following differences: subgenital plate with a small low median lobe carrying a strong seta; hypandrium with 3 pairs of apical appendages; tergite 9 with apical teeth short, in a single row.

Ectopsocus ornatoides Thornton and Wong, new species

♀. *Coloration* (after 9 yr in alcohol): Head pale buff, usual markings light grayish brown. Maxillary palp very pale brown, colorless at apex. Antenna: scape and pedicel pale brown, flagellum pale brown basally, darkening to light brown apically. Ocelli pale, on brown protuberance. Eyes black. Mesothoracic terga light brown, a pale buff area at center of dorsum. Metathoracic terga similar, paler. Thoracic pleura pale buff. Leg: very light brown, except trochanter and femur pale. Fore wing (fig. 206) light smoky brown, paler semicircular area at margin of cells R_1, M_1 M_2, M_3, and Cu_1; veins darker. Hind wing pale brown; veins light brown. Abdomen pale with grayish brown transverse bands dorsally.

Morphology: Stronger setae on head fairly thick, long. Setae on basal flagellar segment 2 × as long as thickness of segment. Fore wing (fig. 206) margin bare; setae on veins fine, short, dense; veins *rs* and *m* meet at a point or joined by a short cross-vein; pterostigma broader apically. Hind wing bare. Subgenital plate (fig. 207): apical lobes broadly triangular, each with 2 stout and 2 finer setae, sclerotization on lining even. Gonapophyses (fig. 208): ventral valve very broad and rounded basally, outer valve broadened subapically. Paraproct with a median transverse row of 5 long setae and 1 seta nearer. Metric and meristic characters as in Table 18.

♂. *Coloration* (after 8 yr in alcohol): As ♀.

Morphology: Antenna longer and thicker than in ♀, eyes larger. Hypandrium (fig. 209) with a small apical lobe. Penis frame (fig. 210) inner parameres not sclerotized; a large posterior triangular sclerite and 2 sickle-shaped sclerites, the smaller 1 forked with both prongs pointed. Tergite 9 (fig. 211) broad, trapezoid, lateral margins convex, apical comb with 24–30 (5 specimens) teeth. Metric and meristic characters as in Table 18.

DISTRIBUTION: Micronesia, Fiji, Samoa, Hawaiian Islands.

MATERIAL EXAMINED: Holotype ♀ (CM) (tube M215, slides M215, a, b), Laulau Bay area, Saipan, S. Marianas, Micronesia, beating vegetation, 3.XII.1944, Dybas; allotype ♂ (tube M199, slides M199a, b), Kalabera area, Saipan, S. Marianas, Micronesia, beating vegetation, 28.I.1945,

Table 18. Metric (in mm) and meristic characters of 5 ♀♀ and 5 ♂♂ of *Ectopsocus ornatoides*.

	♀					♂				
B	1.58	1.56	1.82	1.70	1.58	1.26	1.38	1.56	–	1.30
A	1.250	1.115	1.100	1.200	1.210	1.180	1.330	1.330	1.335	1.330
f_1	0.285	0.245	0.250	0.280	0.280	0.265	0.205	0.320	0.325	0.290
f_2	0.170	0.165	0.160	0.170	0.170	0.160	0.185	0.200	0.190	0.185
Ratio f_1/f_2	1.65	1.50	1.58	1.62	1.62	1.67	1.64	1.60	1.69	1.57
Ratio I. O.: D.	3.54	3.23	3.68	3.54	3.43	2.12	2.00	1.77	1.71	2.00
Fw	1.48	1.32	1.42	1.44	1.28	1.20	1.30	1.40	1.40	1.26
Hw	1.20	1.10	1.12	1.18	1.16	0.98	1.10	1.16	1.14	1.08
Hf	0.320	0.290	0.300	0.330	0.330	0.280	0.300	0.330	0.330	0.300
Ht	0.570	0.525	0.525	0.570	0.565	0.515	0.570	0.590	0.590	0.525
t_1	0.210	0.190	0.185	0.200	0.200	0.185	0.210	0.200	0.225	0.190
t_2	0.080	0.080	0.080	0.080	0.080	0.080	0.075	0.075	0.080	0.080
Ratio t_1/t_2	2.67	2.42	2.34	2.50	2.50	2.34	2.76	2.58	2.84	2.42
Ct	17	15	14	15	14	14	13	15	14	15
Tr	8	8	8	8	8	8	8	8	8	8

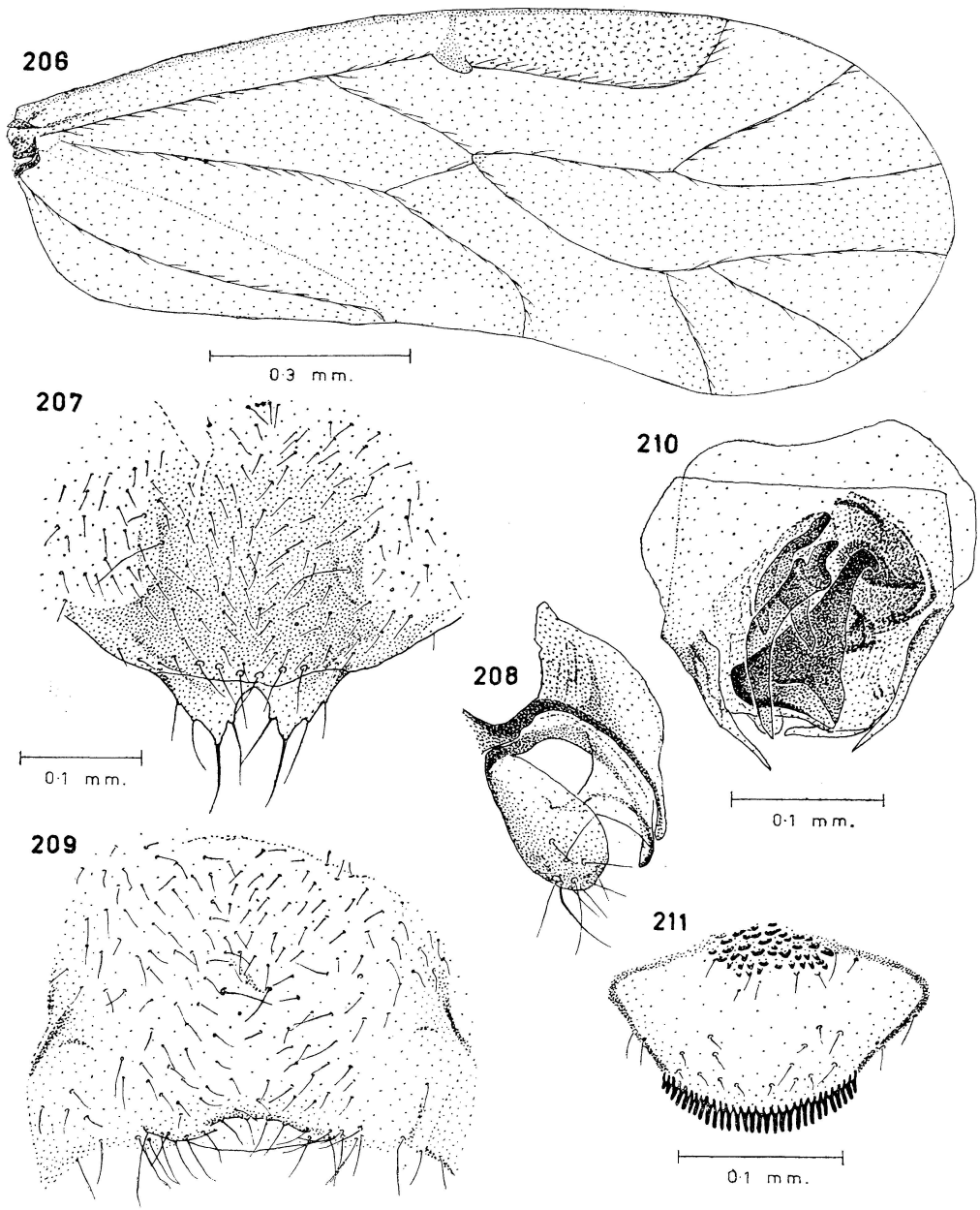


Fig. 206-211. *Ectopsocus ornatoides*: 206, ♀ fore wing; 207, subgenital plate; 208, gonapophyses; 209, hypandrium; 210, penis frame; 211, ♂ apical abdominal tergite. (207, 209 and 208, 210 to common scales.)

Dybas; paratypes 1 ♀, 1 ♂, same collecting data as holotype; 4 ♀♀, 2 ♂♂, same collecting data as allotype.

MICRONESIA: *BONINS: CHICHI JIMA:* 6 ♀♀, 10.VII.1951, Bohart. *VOLCANOS: IWO JIMA:* 5 ♀♀, 4 ♂♂, sweeping, 11.V.1956, Goss. *S. MARIANAS:* collected by Dybas. *SAIPAN:* 1 ♀, As Mahetog area, beating vegetation, 2.XII.1944; 4 ♀♀, 5 ♂♂, same loc., 19.I.1945; 1 ♂, same loc., 2.II.1945; 3 ♀♀, 1 ♂, same loc., at light, 16.V.1945; 3 ♀♀, 2 ♂♂, 7.V.1945; 1 ♀, near Garapan, 24.XII.1944; 1 ♀, Turturam, Laulau Bay, 22.I.1945; 1 ♀, hills E of Garapan, beating vegetation, 23.I.1945; 1 ♂, Talofofo ridge, sweeping in open country, 23.I.1945; 2 ♀♀, Chalan Laulau area, 24.I.1945; 2 ♀♀, Halaikai, As Teo area, 4.II.1945; 1 ♀, 1 ♂, same data, 7.II.1945; 1 ♀, Sadog Talofofo, Talofofo area, beating vegetation, 9.II.1945; 1 ♀, 3 ♂♂, Kolabera area, 16.II.1945; 1 ♀, Tagpochau, 380 m, 18.II.1945; 1 ♀, 1–15.III.1945; 1 ♂, HangmanPoint area, 16.III.1945; 4 ♀♀, 2 ♂♂, 17.IV.1945. *TINIAN:* 1 ♀, NW slope of Mt. Lasso, 1.IV.

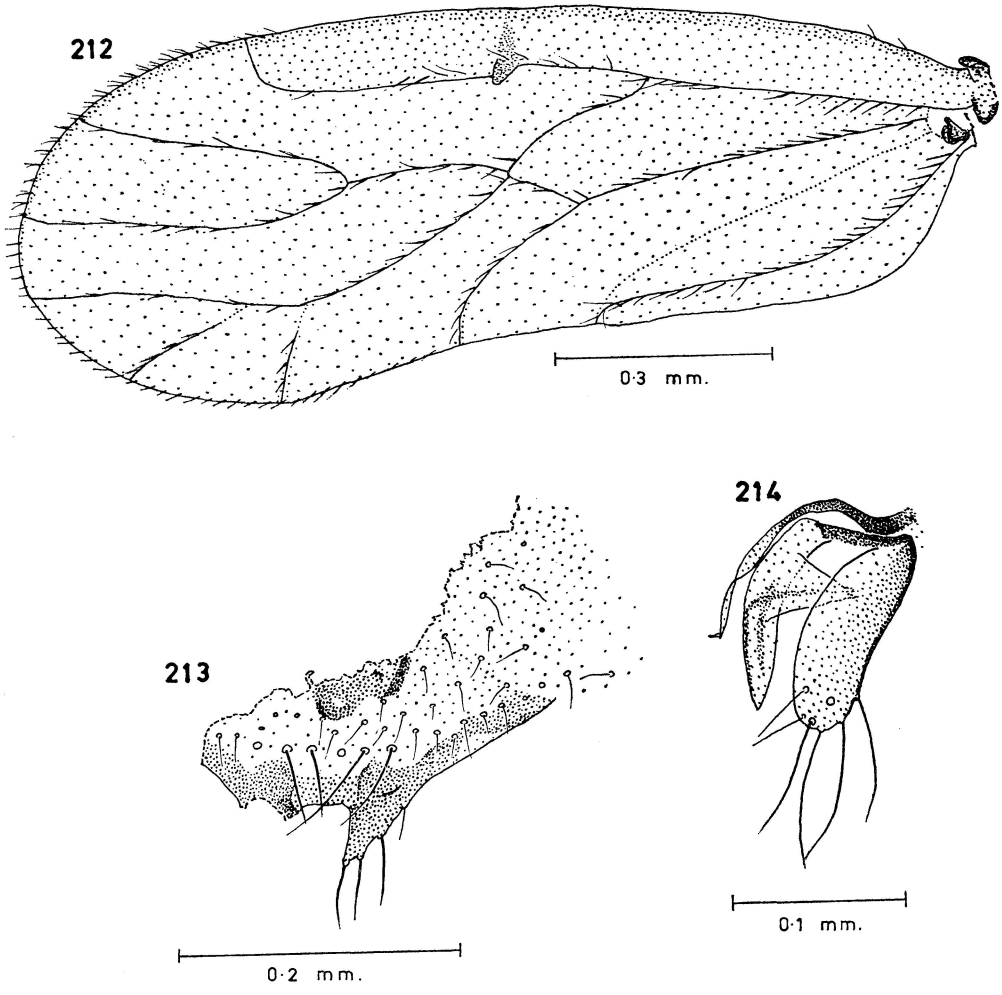


Fig. 212-214. *Ectopsocus paraplesius* ♀: 212, fore wing; 213, subgenital plate; 214, gonapophyses.

1945; 5 ♀♀, NE slope of Mt. Lasso, 14.IV.1945. *CAROLINES: PALAU:* 1 ♂, N end of Peleliu, 5.VIII.1945, Dybas; 1 ♀, Ngerchelong, Babelthuap, at light, 6–8.V.1957, Sabrosky; *KOROR:* 1 ♀, 1.VI.1953, Beardsley. *TRUK:* 1 ♂, Moen, Civ. ad. area. at light, 1.III.1949, R. W .L. Potts. *PONAPE:* 1♀, SE Nanponmal, Berlese funnel, 11.I.1953, Gressitt. *KUSAIE:* 1♀, Tafunsak, 1 m, ex fruit of Ku 75, 10.III.1953, Clarke. *MARSHALLS: JALUIT:* 1 ♀, Jabor I., on *Erythrina*, 1.V. 1958,Gressitt; 1♀, Jabor I., 27.IV.1958, Gressitt. *JEMO:* 1♀, Jemo, sweeping Leptums, Fosberg.

FIJI: 1 ♂, Mt. Victoria, 900–1200 m, Vitilevu, 13.IX.1938, Zimmerman.

SAMOA: 1 ♀, Naval Station, Tutuila, 19.VIII.1940, Zimmerman.

HAWAII: See Thornton (in press).

This species closely resembles *E. ornatus* Th. (Hong Kong, Taiwan) and *E. spilotus* (Micronesia, Fiji, Samoa, Hawaii) both in morphology and genitalic characters. It differs from both in lining sclerotization of female subgenital plate, further from the former in that both prongs of the smaller sickle-shaped radula sclerite are pointed, from the latter in that the larger sickle-shaped radula sclerite is pointed, in the absence of the lambda-shaped radula sclerite, as well as in fore wing coloration. The female subgenital plate resembles that of *E. pearmani* Ball (Africa), but *E. ornatoides* differs from it in the lightly patterned fore wing, and in that the outer valve of the gonapophyses is broadened.

Ectopsocus paraplesius Thornton and Wong, new species

♀. *Coloration* (after 11 yr dry storage, restored in alcohol): Head very light brown, pattern indiscernible. Maxillary palp lost. Antenna: scape and pedicel brown, rest lost. Ocelli pale, protuberance color faded. Eye color lost. Thorax light buff, marking indiscernible. Leg: coxa light brown, trochanter and femur cream, tibia and tarsal segments brown. Fore wing (fig. 212) very light brown, slightly darker along apices of m_3 and cu_1; veins brown, except m_2 and m_3 hyaline at origin. Hind wing very light brown; veins brown. Abdomen buff.

Morphology: Fore wing (fig. 212) marginal setae very fine, short, extra row from *sc* to r_{4+5}; setae on veins fairly thick, short, dense; vein *rs* and *m* united by a short cross-vein; *r* fork about 2 × as long as stem, wide basally. Hind wing bare. Subgenital plate (fig. 213) apical lobes triangular, with 3 stout and 1 fine setae on

Table 19. Metric (in mm) and meristic characters of *Ectopsocus paraplesius* (♀) and 1 ♀ and 2 ♂♂ of *E. spilotus*, and 5 ♀♀ of *E. gradatus*.

	E. paraplesius	*E. spilotus*			*E. gradatus*				
	♀	♀	♂		♀				
B	–	–	–	–	1.78	2.00	1.56	1.80	–
A	–	–	1.115	–	1.335	–	1.460	1.465	1.460
f_1	–	0.240	0.230	0.260	0.315	0.340	0.305	0.345	0.330
f_2	–	0.125	0.150	0.160	0.210	0.230	0.225	0.225	0.230
Ratio f_1/f_2	–	1.85	1.52	1.62	1.52	1.47	1.35	1.53	1.43
Ratio I. O.: D.	3.84	3.83	2.58	2.40	3.25	3.33	3.12	3.33	3.32
Fw	1.33	1.30	1.18	–	1.58	1.64	1.54	1.60	1.62
Hw	1.05	1.10	0.98	1.02	1.32	1.32	1.26	1.32	1.32
Hf	0.330	0.320	0.290	0.305	0.390	0.385	0.370	0.390	0.390
Ht	0.525	0.515	0.505	0.545	0.650	0.650	0.625	0.635	0.635
t_1	0.185	0.190	0.190	0.200	0.230	0.230	0.230	0.230	0.225
t_2	0.080	0.080	–	0.075	0.080	0.080	0.085	0.080	0.080
Ratio t_1/t_2	2.34	2.42	–	2.73	2.92	2.92	2.70	2.92	2.84
Ct	13	13	12	14	16	16	16	14	17
Tr	8	8	8	7	8	8	8	8	8

lateral margin; sclerotization complete, continues beyond base. Main plate sclerotized along posterior margin between apical lobes, and on lining as a punctured plate. Gonapophyses (fig. 214): ventral valve very narrow; outer valve well developed, apical 1/4 with 4 thick, very long setae. Paraproct with a median transverse row of 4 long setae, and a small double spine with unequal members on mesial face. Metric and meristic characters as in Table 19.

♂. Unknown.

DISTRIBUTION: Micronesia.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7971) (tube M85, slides M85a, b), Pac. Sci. Bd., Mt. Unibot, 300 m, Tol. I., Truk, Carolines, Micronesia, 4.II.1953, Gressitt.

E. paraplesius closely resembles *E. triangulus* (New Guinea, Malaya) but differs in the base of m_2 in the fore wing being hyaline, in the density of fore wing setae on the veins, and in the shape and chaetotaxy of the outer valve.

Ectopsocus salpinx Thornton and Wong, new species

See p. 70.

Ectopsocus separatus Thornton and Wong, new species

♀. *Coloration* (after 13 yr in alcohol): Head light brown, markings and striae chocolate brown. Maxillary palp light brown. Antenna light brown. Ocelli pale. Eyes black. Thorax light brown, markings indistinct. Leg: light brown, except femur cream. Fore wing almost hyaline, veins very light brown. Hind wing similar. Abdomen cream.

Morphology: Fore wing (fig. 215): marginal setae microscopic, extra row from *sc* to m_1, setae on veins short, dense; pterostigma broader basally, apex smoothly rounded, granulation coarse; veins *rs* and *m* meet at a point; *r* fork about 3× as long as stem. Hind wing bare. Subgenital plate (fig. 216) apical lobes triangular, mesial margins divergent; each with 4 fine setae on projections on lateral margin; sclerotization at anterolateral corners and along mesial margin. Sclerotization of main plate weak, complete. Gonapophyses (fig. 217): ventral valve narrow; outer valve elongate, sides parallel, bent laterally, with an apical field of 7 fine short setae. Paraproct with a median transverse row of 5 long setae. Metric and meristic characters as in Table 22.

♂. Unknown.

DISTRIBUTION: Micronesia.

MATERIAL EXAMINED: Holotype ♀ (US 69635) (tube M21, slides M21a, b), Malem R., 90 m, Kusaie, Carolines, Micronesia, 27.IV.1953, Clarke.

The fore wing pattern and the female genitalia of *E. separatus* show some similarity to those of *E. cinctus* Th. (India, Hong Kong, Malaya, Vietnam). However, *E. separatus* can be distinguished by the shape of the apical lobes of the subgenital plate and the relatively long outer valve.

Ectopsocus speciosus Thornton and Wong, new species

See p. 87.

Ectopsocus spilotus Thornton and Wong, new species

♀. *Coloration* (after 9 yr of dry storage, restored in alcohol): Head dark brown, no marking. Sagittal suture very dark brown. Maxillary palp lighter brown than head, coloration uniform. Antenna: scape and pedicel dark brown, flagellum brown basally, darkening towards apex. Ocelli pale, on dark brown protuberance. Eyes very dark chocolate brown. Mesothoracic terga dark brown, with small central buff spot, sutures darker, distinct. Metathoracic terga paler, without buff spot. Thoracic pleura brown. Leg: brown, except trochanter and femur pale. Fore wing (fig. 218) dark brown, darker at *rs-m* junction and at vein apices, with hyaline base and hyaline semicircular area at margin of each marginal cell including pterostigma; veins brown, darker at apex, otherwise bordered by a narrow hyaline strip. Hind wing light brown, costal cell darker, otherwise uniform; veins brown. Abdomen brown.

Morphology: Head setae fairly thick and fairly long. Antennal setae about 1.5× as long as breadth of

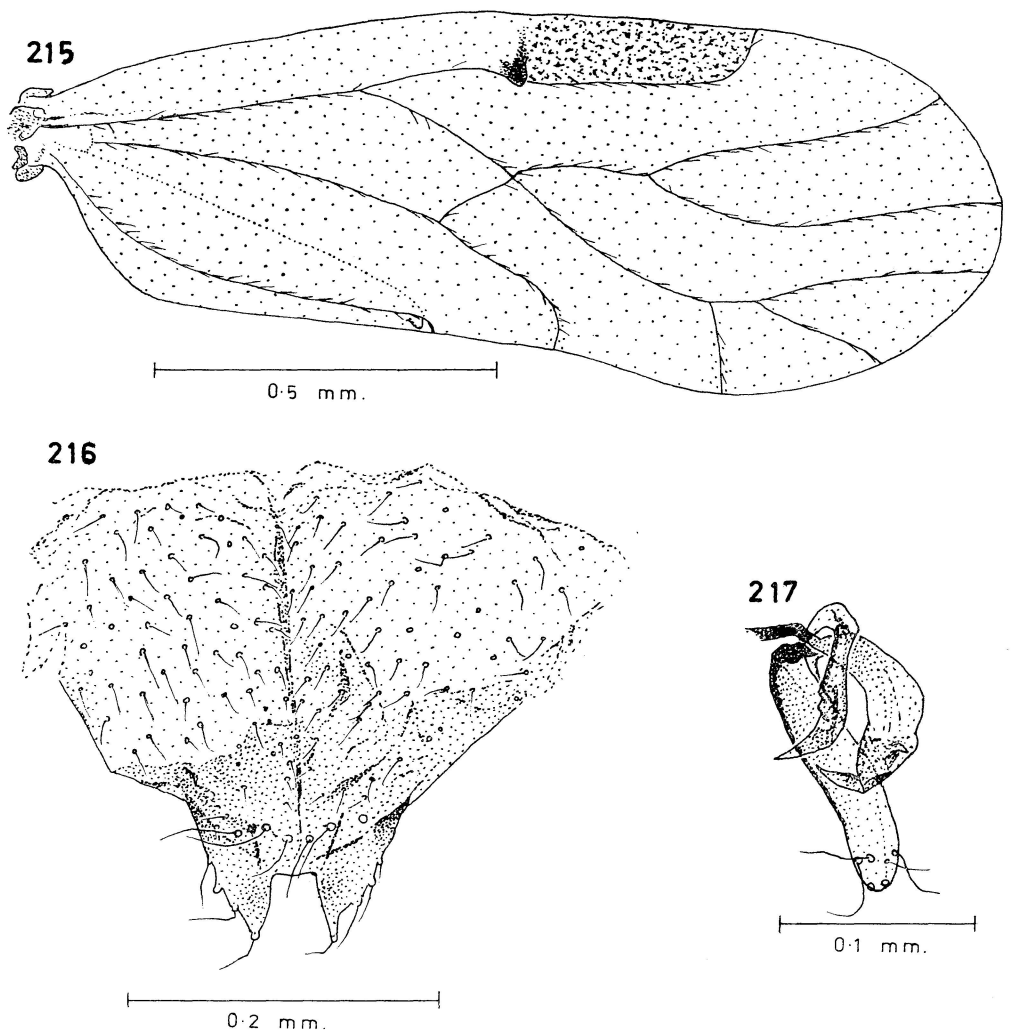


Fig. 215-217. *Ectopsocus separatus* n. sp. ♀: 215, fore wing; 216, subgenital plate; 217, gonapophyses.

basal flagellar segment. Fore wing (fig. 218) margin bare; setae on veins fine, short, dense; pterostigma broader apically; veins *rs* and *m* meet at a point or fuse for a short length. Hind wing bare. Subgenital plate (fig. 219) apical lobes broadly triangular, each with 2 stout and 2 finer setae, main plate lining sclerotization as a small circular median spot. Gonapophyses (fig. 220): ventral valve very broad and rounded basally, outer valve broadened subapically. Paraproct with a median transverse row of 5 long setae and 1 seta nearer margin, and a very small double spine on mesial face. Metric and meristic characters as in Table 19.

♂. *Coloration* (after 9 yr of dry storage, restored in alcohol): As ♀.

Morphology: Antenna thicker and eyes larger than ♀. Hypandrium (fig. 221, 222) with a small apical lobe and a row of 5 small spines at center of posterior margin of sternum 8. Penis frame (fig. 223) inner parameres not sclerotized, large sickle-shaped radula sclerite truncate, small sickle-shaped radula sclerite 2-pronged, both prongs pointed, an extra lambda-shaped large radula sclerite.

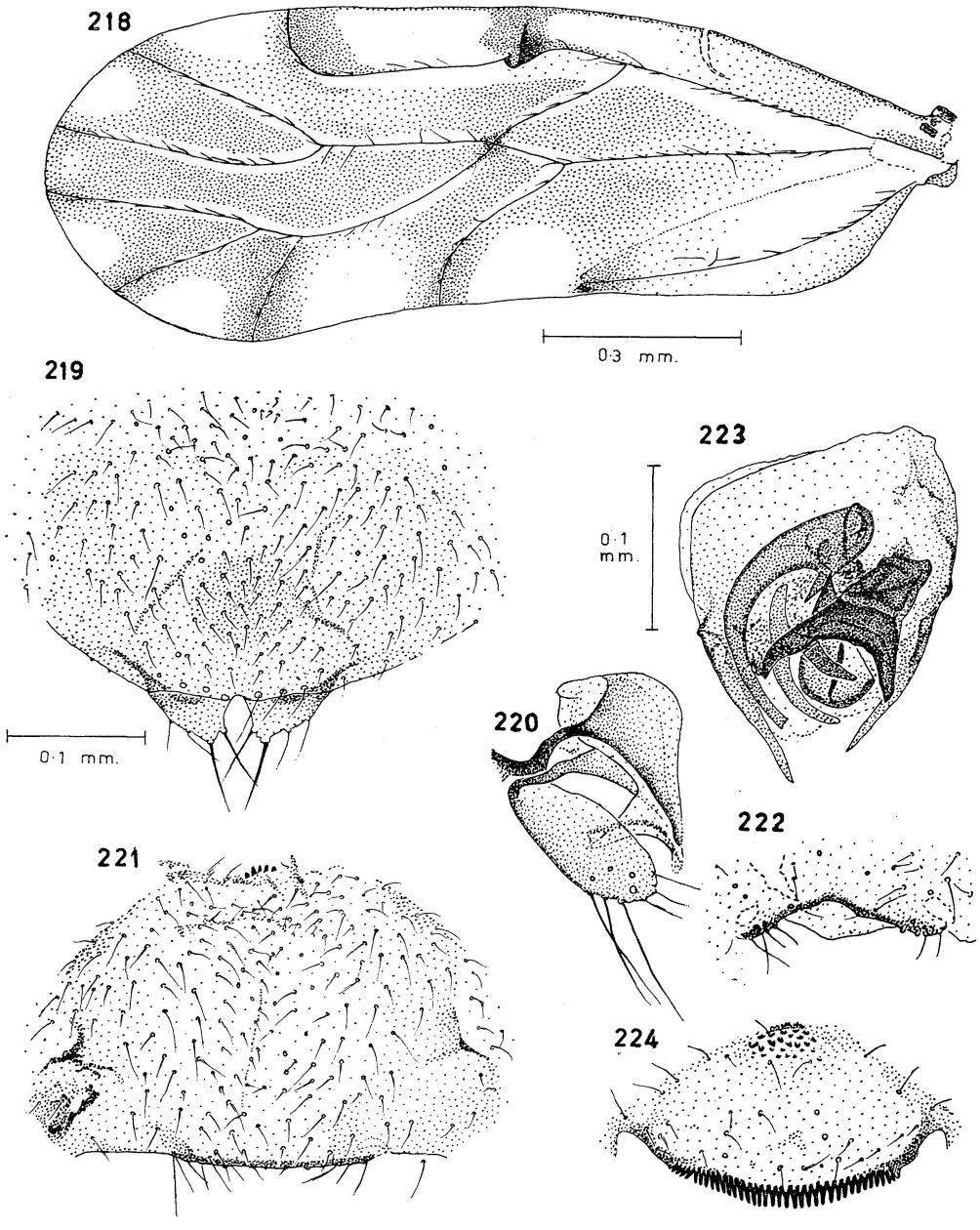


Fig. 218-224. *Ectopsocus spilotus*: 218, ♀ fore wing; 219, subgenital plate; 220, gonapophyses; 221, hypandrium; 222, another hypandrium; 223, penis frame; 224, ♂ apical abdominal tergite. (219, 221, 222 and 220, 223, 224 to common scales.)

Tergite 9 (fig. 224) broad, trapezoid, lateral margins convex, apical comb of 34–35 (2 specimens) teeth. Metric and meristic characters as in Table 19.

DISTRIBUTION: Micronesia, Fiji, Samoa, Hawaiian Islands.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7972) (tube M318, slides M318a, b), Betio I., Tarawa Atoll, Gilberts, Micronesia, XI.1957, Krauss; allotype ♂, same collecting data (tube M317, slides M317a, b); paratype ♂ (tube M316, slides M316a, b), Arno Atoll, Marshalls, Micronesia, 26.VI.1950, R. L. Usinger; 1 ♀, Majuro, Marshalls, Micronesia, 26.IV.1950, I. La Rivers.

FIJI: 1 ♀, 1.6 km S of Marona, 90 m, Mango, 14.VIII.1938, Zimmerman; 1 ♀, Mt. Victoria, 1300 m, Vitilevu, 13.IX.1938, Zimmerman; 1 ♀, Munia, 240–280 m, 3.VIII.1938, Zimmerman.

SAMOA: 1 ♂, Naval Station, Tutuila, 16.VIII.1940, Zimmerman & Swezey.

HAWAII: See Thornton (in press).

This species closely resembles *E. ornatus* Th. (Hong Kong, Taiwan) and *E. ornatoides* (Micronesia, Fiji, Samoa, Hawaii) both in morphology and genitalic characters. It differs from both in general and fore wing coloration, in subgenital plate lining sclerotization, in the truncate tip of the large sickle-shaped aedeagal sclerite, in the presence of an extra lambda-shaped radula sclerite, and in the presence of small spines at the anterior margin of hypandrium. The female subgenital plate resembles that of *E. pearmani* Ball (Africa) but differs in that the fore wing is patterned, and the outer valve of the gonapophyses is broadened subapically.

Ectopsocus thysanus Thornton and Wong, new species

♀. *Coloration* (after 21 yr in alcohol): Head, thorax and abdomen cream, markings indiscernible. Maxillary palp very light brown. Antenna: scape very light brown, pedicel and basal 1/2 of f_1 very light brown, flagellar color fading towards apex. Leg: very light brown, except trochanter and femur cream. Fore wing (fig. 225) almost hyaline, very light brown along apex of m_2, m_3 and cu_1; veins very light brown. Hind wing hyaline, veins very light brown.

Morphology: Setae on head stout, long, sparse. Femur short, broad. Fore wing (fig. 225) marginal setae thick, long, extra row from *sc* to m_1, setae on veins very thick, very long, sparse; pterostigma finely granulate; veins *rs* and *m* meet at a point or are united by a cross-vein; *r* fork wide, *m* displaced towards posterior margin. Hind wing with 15–19 (10 specimens) fairly thick, long marginal setae between r_1 and r_{4+5}. Sub-

Table 20. Metric (in mm) and meristic characters of 5 ♀♀ and 5 ♂♂ of *Ectopsocus thysanus*.

	♀					♂				
B	1.48	1.54	1.56	1.62	1.62	1.52	1.42	1.42	1.40	1.28
A	0.830	0.830	0.850	0.830	0.850	0.835	0.835	0.820	0.800	0.660
f_1	0.165	0.165	0.160	0.165	0.180	0.160	0.165	0.150	0.140	0.140
f_2	0.095	0.095	0.100	0.095	0.100	0.100	0.095	0.095	0.085	0.065
Ratio f_1/f_2	1.79	1.79	1.60	1.79	1.80	1.60	1.79	1.64	1.62	2.10
Ratio I. O.: D.	5.00	4.80	4.80	5.00	5.00	4.55	5.20	5.00	4.80	4.60
Fw	1.26	1.22	1.28	1.24	1.26	1.26	1.26	1.22	1.20	1.10
Hw	1.02	1.00	1.02	1.02	1.02	1.02	1.04	1.02	0.98	0.90
Hf	0.290	0.290	0.300	0.290	0.300	0.300	0.320	0.300	0.300	0.270
Ht	0.475	0.465	0.475	0.465	0.475	0.490	0.505	0.470	0.465	0.425
t_1	0.160	0.150	0.160	0.150	0.150	0.160	0.160	0.165	0.160	0.145
t_2	0.065	0.065	0.075	0.065	0.065	0.075	0.065	0.065	0.065	0.065
Ratio t_1/t_2	2.40	2.30	2.18	2.30	2.30	2.18	2.40	2.50	2.40	2.20
Ct	12	14	11	12	11	13	11	11	14	10
Tr	8	8	8	8	8	8	8	8	8	8

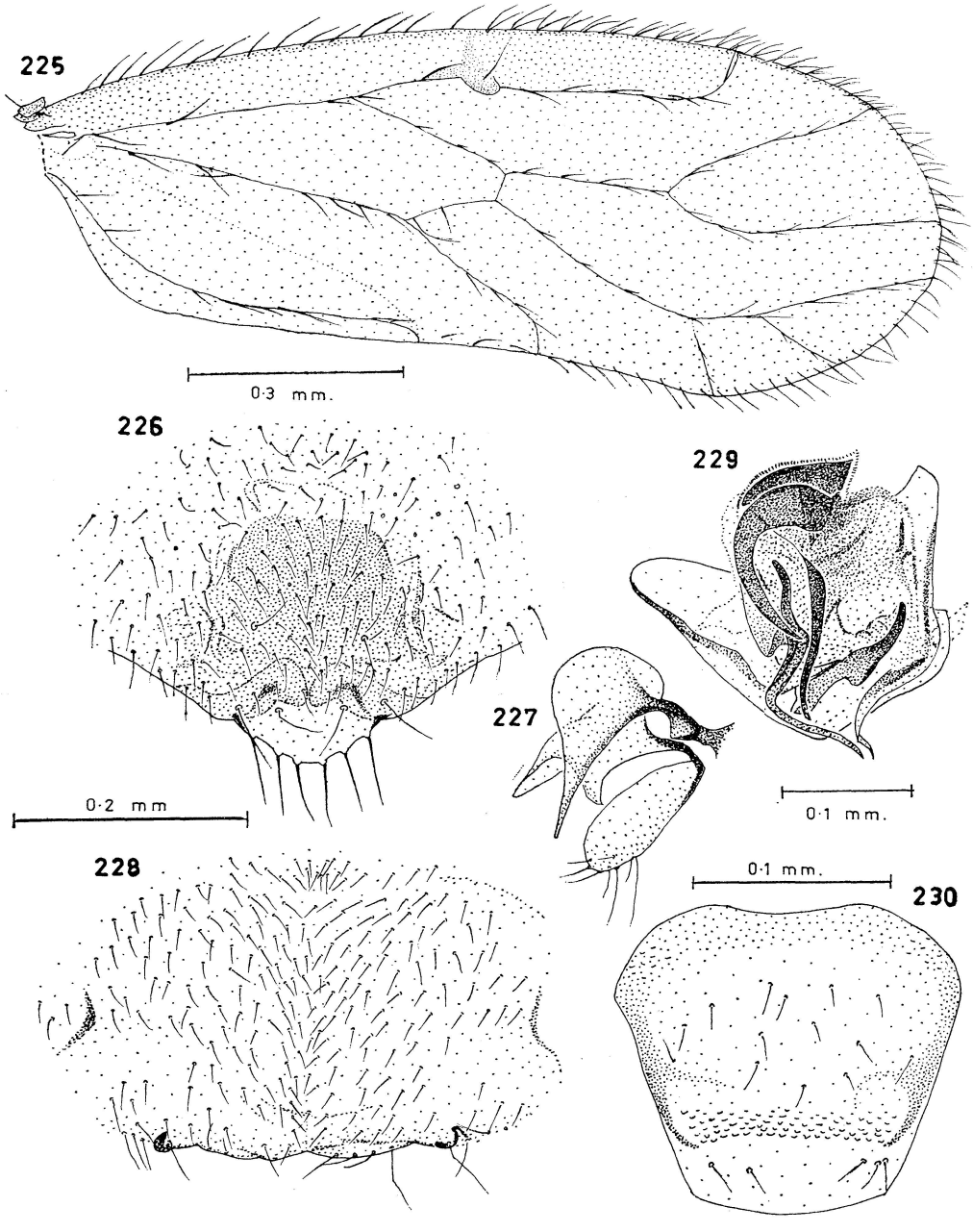


Fig. 225-230. *Ectopsocus thysanus*: 225, ♀ fore wing; 226, subgenital plate; 227, gonapophyses; 228, hypandrium; 229, penis frame; 230, ♂ apical abdominal tergite. (226, 227, 229 to common scale.)

genital plate (fig. 226) apical lobe median, small, semicircular; 6 stout apical setae, small spot of sclerotization at anterior corners. Sclerotization on main plate as 2 ovoid areas, on lining as a large sheet with 2 large hook-like structures posteriorly. A row of 4 (not 6) large subapical setae on main plate. Gonapophyses (fig. 227): ventral valve very broad and rounded basally, tapering to a point apically; outer valve dilates gradually from base, with apical field of 6–8 (5 specimens) fine setae. Paraproct with a median transverse row of 4 long setae, and a double spine on mesial face. Metric and meristic characters as in Table 20.

♂. *Coloration* (after 21 yr in alcohol): As ♀.

Morphology: Antenna thicker, and with denser and stouter setae than ♀. Hypandrium (fig. 228) with lateral hook. Penis frame (fig. 229) inner parameres not fused; 3 of the 4 radula sclerites pointed. Tergite 9 (fig. 230) trapezoid, almost as broad as long, with subapical band of small tubercles; sclerotized laterally and anteriorly. Metric and meristic characters as in Table 20.

DISTRIBUTION: Micronesia.

MATERIAL EXAMINED: Holotype ♀ (CM) (tube M131, slides M131a, b), Sadog Talofofo, Talofofo area, Saipan, S. Marianas, Micronesia, beating vegetation, 9.V.1945, Dybas; allotype ♂, (tube M311, slides M311a, b), Turturam, Laulau Bay, Saipan, S. Marianas, Micronesia, beating vegetation, 21.I.1945, Dybas; paratypes 7 ♀♀, 4 ♂♂, same collecting data as holotype, 1 ♀, 1 ♂, same collecting data as allotype.

MICRONESIA: *S. MARIANAS: SAIPAN:* collected by Dybas: 1 ♀, Turturam, Laulau Bay, 22.I.1945; 2 ♀♀, Kalabera area, beating vegetation, 28.I.1945; 1 ♀, Halaihai, As Teo area, 7.II. 1945; 1 ♀, 2 ♂♂, Kalabera, 16.II.1945; 2 ♀♀, near Garapan, beating vegetation, 3.III.1945. *TINIAN:* 1 ♀, NW slope of Mt. Lasso, 18.III.1945; 1 ♀, ridge SE section, 27.III.1945; 1 ♀, NW slope of Mt. Lasso, 4.IV.1945; 1 ♀, NE slope of Mt. Lasso, 14.IV.1945; 1 ♀, 16–30.IV.1945. *GUAM:* 1 ♀, Ritidian Point, on fern, 15.IV.1936, E. H. Bryan, Jr.; 1 ♀, 3 ♂♂, Yigo, II.1958, Krauss.

E. thysanus resembles *E. coccophilus* Ball (Congo) in female subgenital plate as well as in fore and hind wing chaetotaxy. It differs from it in pattern of sclerotization in the subgenital plate and the number of setae on the apical lobe, in the shape of the outer valve of the gonapophyses, and in the number of paraproct setae.

Ectopsocus villosus Thornton and Wong, new species

♀. *Coloration* (after 13 yr dry storage, restored in alcohol): Head light orange-brown, markings hardly discernible. Maxillary palp light brown. Antenna light brown, darkening towards apex. Ocelli pale. Eyes brown. Thorax light orange-brown. Leg: coxa very light brown, trochanter and femur cream, tibia and tarsal segments light brown. Fore wing (fig. 231) very light brown, slightly darker along apex of m_3 and cu_1; veins light brown. Hind wing lighter, veins light brown. Abdomen very light orange-brown.

Morphology: Setae on head long, sparse. Femur broad. Fore wing (fig. 231) marginal setae thick, long, extra row from *sc* to m_1; setae on veins very thick, very long, sparse; pterostigma granulation fine; veins *rs* and *m* either meet at a point or are united by a short cross-vein; *r* fork wide; *m* displaced towards posterior margin. Hind wing with 14–17 (10 specimens) thick, long marginal setae between r_1 and r_{4+5}. Subgenital plate (fig. 232) apical lobe median, triangular; 6 stout apical setae; sclerotization central. Four (5 being aberrant) (not 6) subapical setae on apical lobe. Sclerotization in main plate as 2 oblique ovoid areas on lining as large sheet with heavily sclerotized posterior lobe. Gonapophyses (fig. 233): ventral valve very broad and rounded basally, constricting to a point apically; outer valve gradually broadening, with apical field of 7 fine setae. Paraproct with a row of 4 long setae, and a double spine with unequal members on mesial face. Metric and meristic characters as in Table 21.

♂. *Coloration* (after 13 yr dry storage, restored in alcohol): As ♀.

Morphology: Antenna thicker, and with denser and stouter setae than ♀. Hypandrium (fig. 234) with lateral hook, setose. Penis frame (fig. 235, 236) inner parameres fused, 2 small divergent prongs at apex; 3 of the 5 radula sclerites pointed. Abdominal tergite 9 (fig. 237) long, with apical row and subapical group

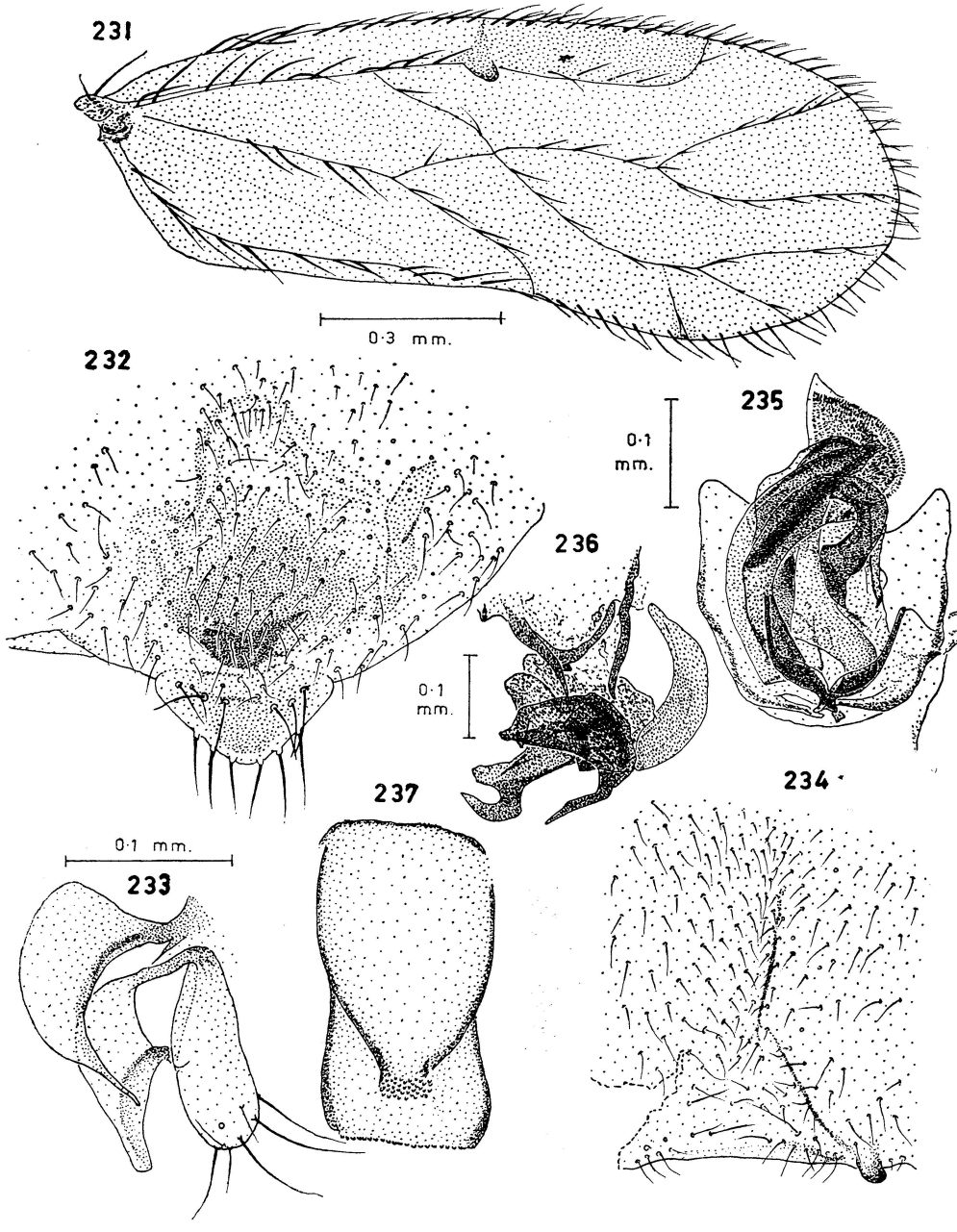


Fig. 231-237. *Ectopsocus villosus* : 231, ♀ fore wing; 232, subgenital plate; 233, gonapophyses; 234, hypandrium; 235, penis frame; 236, penis frame with aedeagal sclerites on eversion; 237, ♂ apical abdominal tergite. (232, 234, 235, 237 to common scale.)

Table 21. Metric (in mm) and meristic characters of 5 ♀♀ and 5 ♂♂ of *Ectopsocus villosus*.

	♀					♂				
B	1.46	1.48	1.22	1.44	1.20	1.18	1.26	1.36	1.50	1.08
A	0.950	0.860	0.855	0.890	0.940	0.975	0.935	–	–	0.965
f_1	0.195	0.170	0.190	0.185	0.205	0.210	0.200	0.225	0.200	0.210
f_2	0.120	0.105	0.105	0.110	0.120	0.120	0.130	0.130	0.120	0.120
Ratio f_1/f_2	1.65	1.62	1.77	1.69	1.72	1.78	1.53	1.70	1.67	1.78
Ratio I. O.: D.	4.30	4.74	4.66	4.33	2.75	4.67	4.91	4.31	4.66	4.30
Fw	1.32	1.22	1.30	1.26	1.32	1.28	1.28	1.36	1.24	1.32
Hw	1.10	1.00	1.06	1.04	1.04	1.04	1.04	1.12	1.02	1.08
Hf	0.330	0.305	0.330	0.320	0.320	0.340	0.330	0.365	0.325	0.365
Ht	0.525	0.475	0.525	0.505	0.530	0.535	0.530	0.565	0.505	0.570
t_1	0.190	0.175	0.190	0.180	0.185	0.205	0.200	0.210	0.190	0.200
t_2	0.080	0.075	0.075	0.075	0.065	0.080	0.080	0.080	0.075	0.065
Ratio t_1/t_2	2.42	2.36	3.64	2.46	2.80	2.58	2.50	2.67	2.64	3.00
Ct	15	11	13	15	12	12	12	14	12	12
Tr	9	7	8	8	8	8	8	8	8	8

of small tubercles; sclerotization peripheral and obliquely laterally from subapical group of tubercle. Metric and meristic characters as in Table 21.

DISTRIBUTION: Micronesia.

MATERIAL EXAMINED: Holotype ♀ (US 69636) (tube M71, slides M71a, b), Colonia, Ponape, Carolines, Micronesia, 13.I.1953, Clarke; allotype ♂ (tube M42, slides M42a, b), Tafunsak, 1 m, Kusaie, Carolines, Micronesia, ex fruit of Ku 75, 10.III.1953, Clarke; paratype ♂ (M319, slide M319a, b), Mutunlik, Kusaie, Carolines, Micronesia, attracted to drying *Cyathea* leaves, 16.IV. 1953; paratypes 8 ♀♀, Colonia, same collecting data as holotype.

MICRONESIA: *CAROLINES: TRUK:* 1 ♀, 1 ♂, Moen I., N. Mt. Teroken, 28.XII.1952, Gressitt (Pac. Sci. Bd.), 1 ♂, Fefan I., Mt. Iron, 150 m, 31.I.1953, Gressitt, 1 ♀, Tol. I., (Pac. Sci. Bd.); Mt. Unibot, 39 m, 4.II.1953, Gressitt (Pac. Sci. Bd.). *PONAPE:* 5 ♀♀, 1♂, Agr. Exper. Sta., M. C. 2, VI–IX.1950, Adams. *KUSAIE:* 1 ♀, Lelu, Lele, 1 m, beating, 12.III.1953, Clarke; 1 ♀, 1 ♂, Hill 541, 165 m, beating, 19.III.1953, Clarke; 4 ♀♀, 4 ♂♂, Lelu, Lele, 1 m, 14.IV.1953, Clarke; 3 ♀♀, 1 ♂, Malem R., 90 m, 27.IV.1953, Clarke. *MARSHALLS. JALUIT ATOLL:* 1 ♀, 5 ♂♂, Jabor I., 1.V.1958, Gressitt; 1 ♀, 1 ♂, Jabor I., on *Erythrina*, 1.V.1958, Gressitt; 1 ♂, Mejetto I., 25.IV.1953, Gressitt.

The fore and hind wing chaetotaxy of *E. villosus* resembles that of *E. hirsutus* Th. (Hong Kong) but the genitalic characters differ considerably. It is more similar to *E. thysanus* (Micronesia) and *E. coccophilus* Ball (Congo) in genitalic characters.

Eastern Melanesia

Peripsocus ferrugineus Thornton and Wong, new species
See p. 91.

Ectopsocus fullawayi Enderlein
See p. 132.

Ectopsocus myrmecophilus (Enderlein)
See p. 16.

Ectopsocus perkinsi Banks

See p. 118.

Ectopsocus furcatus Thornton and Wong, new species

♀. *Coloration* (after 28 yr in alcohol): Head very light buff, usual pattern and striae very faint. Maxillary palp and antenna very pale brown. Ocelli pale. Eyes brown. Thorax light buff, markings indistinct. Leg: cream, tibia and tarsal segments very pale brown. Fore wing almost hyaline, veins very light brown. Hind wing similar. Abdomen cream.

Morphology: Fore wing (fig. 238) marginal setae microscopic, extra row from *sc* to m_1; setae on veins short, dense; veins *rs* and *m* meet at a point; r_1 recurved at apex; m_2 and m_3 with common stem; pterostigma granulation fine, apex rounded. Hind wing with 3–5 (2 specimens) short marginal setae between *r* fork. Subgenital plate (fig. 239) apical lobes large, each with 4 fine, short subapical setae, 2 on inner, 2 on outer

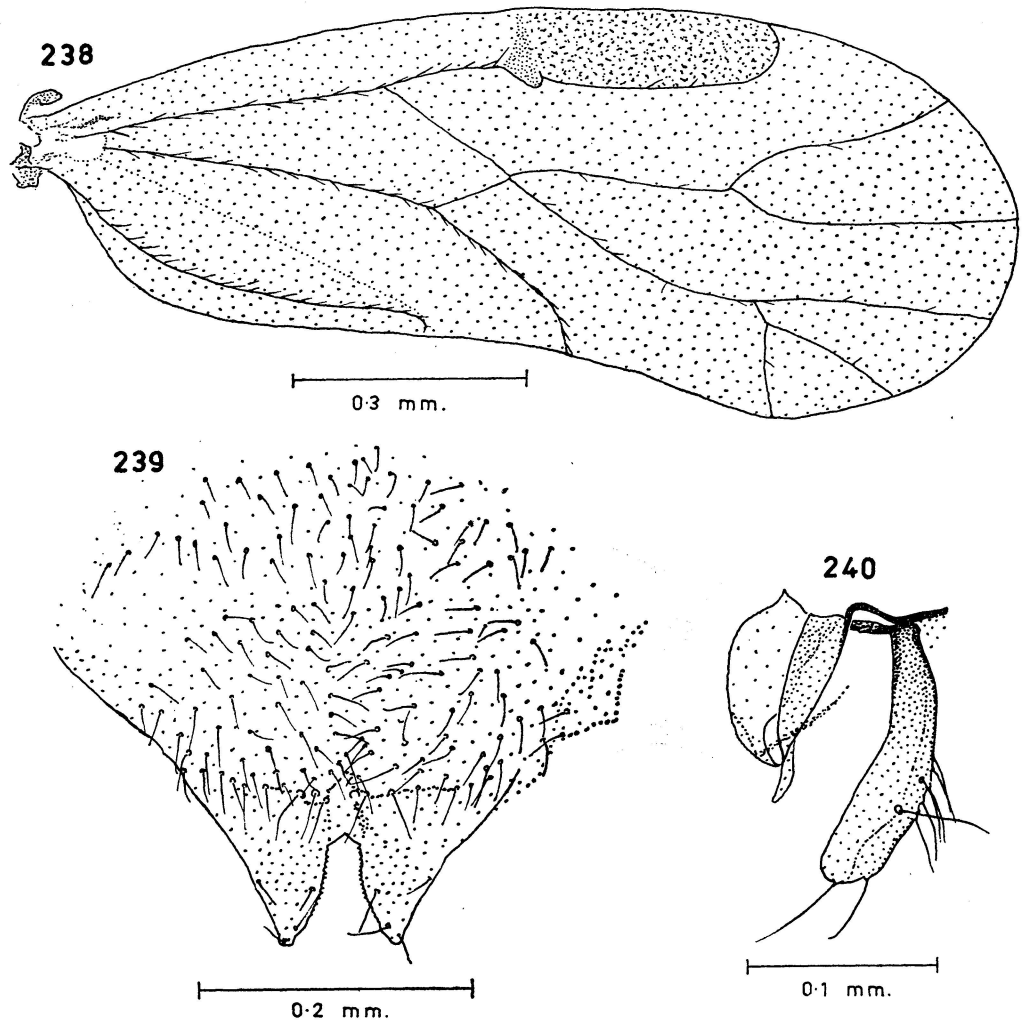


Fig. 238-240. *Ectopsocus furcatus* ♀: 238, fore wing; 239, subgenital plate; 240, gonapophyses.

margin; inner margin curved laterally, beset with minute spines; sclerotization as an oval area on each lobe. Sclerotization of main plate complete, weak. Gonapophyses (fig. 240): ventral valve narrowly triangular; outer valve elongate, slightly broadened in apical 1/2; with 2 apical setae and a row of setae on middle region of lateral margin. Paraproct with a median transverse row of 7 long setae, and a fairly large double spine on mesial face. Metric and meristic characters as in Table 23.

♂. Unknown.

DISTRIBUTION: Malaya, Fiji.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7973) (tube F25.2, slides 25.2a, b), Loma Loma, Vanua Mbalavu, Fiji, 7.VIII.1938, Zimmerman.

MALAYA: 1 ♀, Kuala Lumpur, on dead vegetation, 17.VIII.1963, Lee.

The fore wing of *E. furcatus* is remarkable in that the veins m_2 and m_3 are united at their bases. Whereas this condition was reported in the macropterous female of *Nepiomorpha annulata* Bad. (Angola) as anomalous (the fore wing of which incidentally also lacks an areola postica), it is believed to be a constant feature in *E. furcatus* in that the same condition was found in the fore wings on both sides in both specimens which were collected from different zoogeographical regions. The female genitalia of this species are unusual in *Ectopsocus* in the peculiar apical lobe of the subgenital plate and chaetotaxy of the outer valve of the gonapophyses.

Ectopsocus ornatoides Thornton and Wong, new species

See p. 103.

Ectopsocus spilotus Thornton and Wong, new species

See p. 107.

Ectopsocus uncinatus Thornton and Wong, new species

♀. *Coloration* (after 28 yr in alcohol): Head, thorax, abdomen and appendages cream. Ocelli pale. Eyes brown. Fore wing (fig. 241) almost hyaline, very light brown at *rs-m* junction and along vein apic-s; veins very light brown. Hind wing almost hyaline, veins very light brown.

Morphology: Fore wing (fig. 241) apical veins displaced towards posterior margin; *rs* and *m* m-eet at a point or fuse for a short length; *r* fork longer than stem, very wide, U-shaped. Marginal setae with extra row from *sc* to m_1. Setae on veins fairly long, sparse. Hind wing marginal setae 10–19 (4 sp-cimens), between r_1 and r_{4+5}; veins bare. Subgenital plate (fig. 242) apical lobes truncate, each bearin- 2 stout apical setae; sclerotization lateral, and along margin between lobes. Sclerotization on main plate -s 2 large, oblique ovoid areas, on lining as 2 lateral strongly sclerotized triangles connected by a narrow ba-d. Gonapophyses (fig. 243): all valves narrow; dorsal and outer valves bent at middle away from each oth-r; outer valve with a fine apical seta and a few finer subapical setae. Gonapophyses of 2 sides joined by a br- ad, strongly sclerotized arc. Paraproct with a field of 7 (not 8) trichobothria, a median transverse row of 5 o- 6 long setae, and a long slender double spine on mesial face. Metric and meristic characters as in Table 22.

♂. *Coloration* (after 28 yr in alcohol): As ♀.

Morphology: Hypandrium (fig. 244) simple, setose. Penis frame (fig. 24) open, with 4 simple, pointed radula sclerites, and a complex pointed one with 4 subsidiary prongs. Tergit- 9 (fig. 246) vase-shaped, broader than long, apical comb of long, slender teeth in 2 groups of 20. Metric -nd meristic characters as in Table 22.

DISTRIBUTION: Fiji.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7974) (tube F 16.2, slides F 16.2a, b), Mt. Victoria, 1100 m, Vitilevu, Fiji, 5.IX.1938, Zimmerman; allotype ♂ (tube F1.2, slides F1.2a, b), ridge W of Nandarivatu, Vitilevu, Fiji, 9.IX.1938, Zimmerman; paratype 1 ♀, same collecting data as allotype; 1 ♀, Mvana, Vanua Mbalavu, Fiji, 9.VIII.1938, Zimmerman.

E. uncinatus has a male tergite 9 ornamentation recalling that of *E. maindroni* Bad. (widespread) but possesses the following characters not found in other species of *Ectopsocus:* possession of only

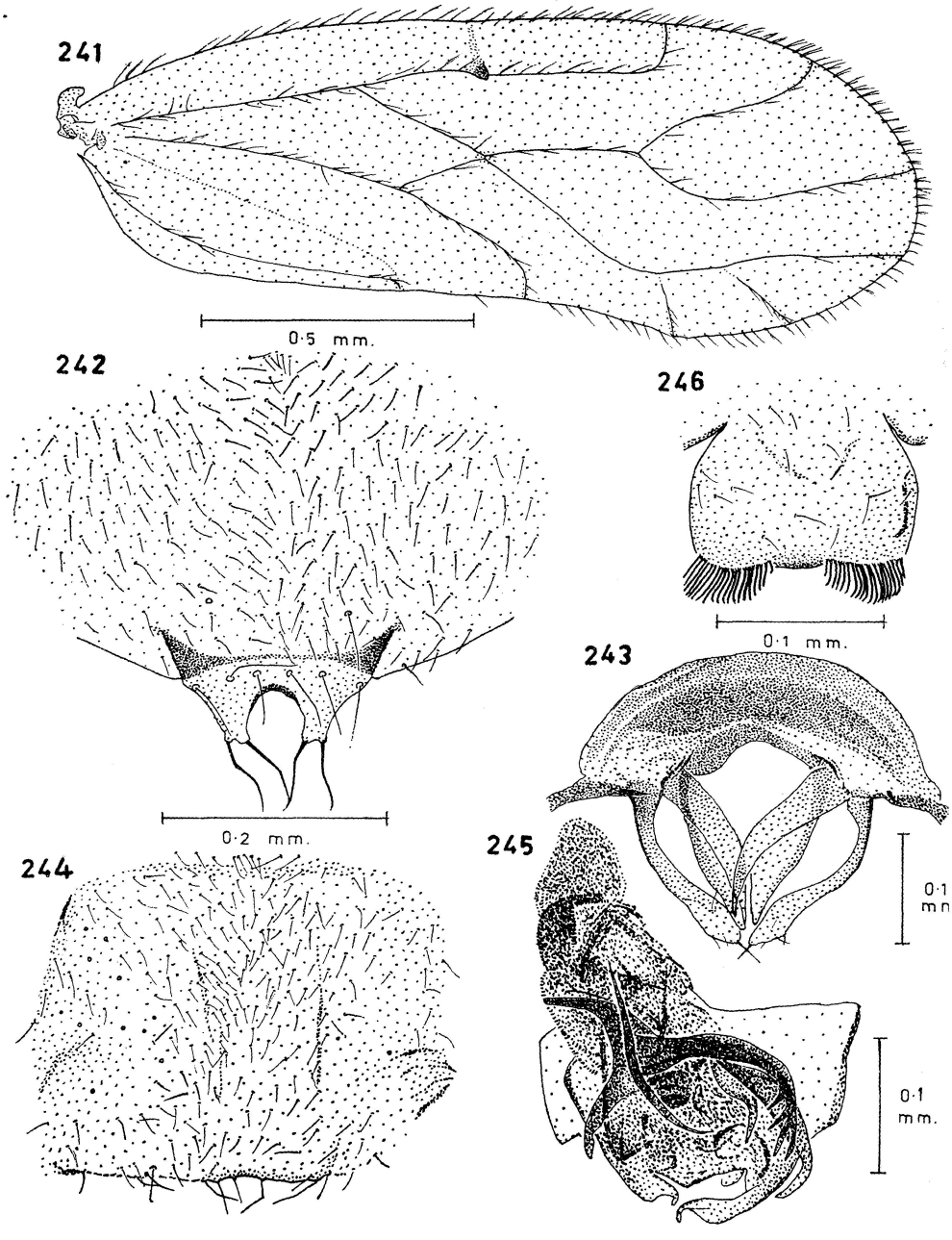


Fig. 241-246. *Ectopsocus uncinatus*: 241, ♀ fore wing; 242, subgenital plate; 243, gonapophyses; 244 hypandrium; 245, penis frame; 246, ♂ apical abdominal tergite. (242, 244 to common scale.)

Table 22. Metric (in mm) and meristic characters of *Ectopsocus separatus* ♀, 3 ♀♀ and 1 ♂ of *E. uncinatus*, and of 3 ♀♀ and 1 ♂ of *E. perkinsi*.

	E. separatus	*E. uncinatus*				*E. perkinsi*			
	♀	♀			♂	♀			♂
B	–	1.42	1.62	1.74	1.56	1.56	1.36	1.42	1.34
A	1.080	1.045	–	–	1.095	–	–	–	–
f_1	0.245	0.210	0.270	0.200	0.210	0.280	0.220	0.190	0.225
f_2	0.115	0.140	0.170	0.130	0.140	0.115	0.125	0.120	0.120
Ratio f_1/f_2	2.18	1.53	1.60	1.53	1.52	2.42	1.74	1.61	1.91
Ratio I. O.: D.	3.42	3.69	3.58	4.16	4.08	3.50	3.92	4.00	3.23
Fw	1.36	1.42	1.56	1.26	1.36	1.26	1.26	1.24	1.24
Hw	1.10	1.18	1.26	1.02	1.10	1.02	1.02	1.02	1.02
Hf	0.360	0.325	0.370	0.325	0.310	0.290	0.300	0.290	0.280
Ht	0.595	0.530	0.555	0.495	0.525	0.470	0.495	0.485	0.480
t_1	0.210	0.185	0.190	0.165	0.185	0.170	0.180	0.170	0.170
t_2	–	0.075	0.075	0.065	0.075	0.075	0.080	0.065	0.075
Ratio t_1/t_2	–	2.46	2.90	2.50	2.54	2.24	2.25	2.60	2.36
Ct	14	13	12	13	14	12	14	13	13
Tr	8	7	7	7	7	8	8	8	8

2 apical setae on apical lobe of subgenital plate; shape of female gonapophyses and connecting arc; and barbed radula sclerite in male penis frame.

Central Polynesia

Peripsocus ferrugineus Thornton and Wong, new species
See p. 91.

Ectopsocus fullawayi Enderlein
See p. 132.

Ectopsocus hawaiiensis Enderlein
See p. 134.

Ectopsocus perkinsi Banks

Ectopsocus perkinsi Banks, 1931b, Proc. Hawaii. Ent. Soc. **7**(3): 438, fig. (distribution).— Zimmerman, 1948, Ins. Hawaii **2:** 235, fig. (distribution).

The original description accompanied by a drawing of the fore wing was based on material collected from Hawaii and provided no information on genitalic characters. The following is a description of the female and male genitalia based on Samoan material.

♀ (supplementary description). *Morphology:* Subgenital plate (fig. 247) apical lobes broadly triangular, each with 2 long stout and 2 finer shorter setae; sclerotization at anterior corners. Sclerotization of main plate complete, on lining as subapical crescentic area. A row of 4 (not 6) large subapical setae on main plate. Gonapophyses (fig. 248): ventral valve broad basally, tapering to a point; outer valve straight, small, with apical field of 6–8 (5 specimens) long setae. Paraproct with a median transverse row of 4 long setae and a very small double spine on mesial face. Metric and meristic characters as in Table 22.

♂ (supplementary description). *Morphology:* Hypandrium (fig. 249) simple. Penis frame (fig. 250) inner parameres not fused (unsclerotized); 2 pointed radula sclerites. Tergite 9 (fig. 251) broad, lateral margin straight, with apical row of 33–35 (3 specimens) teeth, sclerotization lateral. Metric and meristic characters as in Table 22.

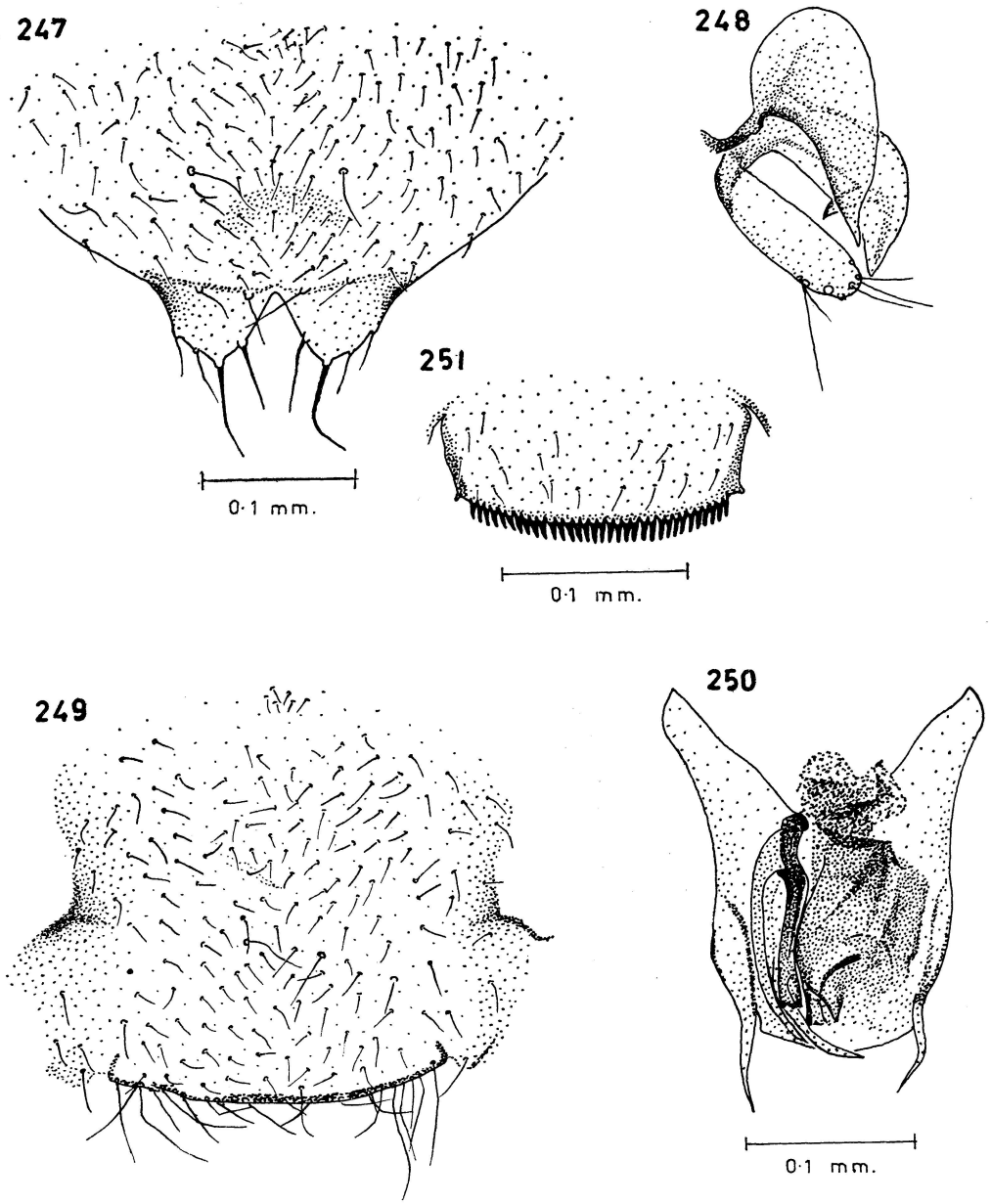


Fig. 247-251. *Ectopsocus perkinsi* Banks: 247, subgenital plate; 248, gonapophyses; 249, hypandrium; 250, penis frame; 251, ♂ apical abdominal tergite. (247, 249 and 248, 251 to common scales.)

DISTRIBUTION. Fiji, Samoa, Hawaiian Islands, Tubuai.

MATERIAL EXAMINED: FIJI: 2 ♀♀, 1 ♂, Navai Hill, Tholo North, 760 m, Vitilevu, 19.IX. 1938, Zimmerman; 1 ♀, Mt. Victoria, 1100 m, Vitilevu, 5.IX.1938, Zimmerman; 1 ♂, Vanua Mbalavu, LomaLoma, 7.VIII.1938, Zimmerman.

SAMOA: 1 ♀, 1 ♂, Apia, Upolu, 430 m, Sinaele, 24.VI.1940, Zimmerman; 2 ♀♀, Amouli, Tutuila, 120–250 m, 2.VIII.1940, Zimmerman.

E. perkinsi shows similarity to *E. fullawayi* End. (Hawaiian Is., Fiji, Samoa, Tubuai, Rapa, Tuamotu Archipelago) in fore wing pattern, and to *E. pearmani* Ball (Africa) particularly in female genitalic characters, differing only in the sclerotization of the subgenital plate. The female genitalic characters are also similar to those of *E. ornatus* Th. (Hong Kong, Taiwan) and differ only in that the outer valve has straight lateral margins and is narrower.

Ectopsocus comptus Thornton and Wong new species,

♀. *Coloration* (after 26 yr in alcohol): Head light buff, usual pattern very light brown. Clypeus with indistinct striae. Maxillary palp light buff. Antenna: scape and pedicel light brown, flagellum paler. Ocelli pale. Eyes brown. Thoracic sclerites buff. Leg: coxa and trochanter cream, rest very light brown. Fore wing (fig. 252) very light brown; veins light brown. Hind wing paler; veins light brown. Abdomen cream.

Morphology: Fore wing (fig. 252) margin bare; setae on veins short, dense; pterostigma granulated, broader apically; veins *rs* and *m* meet at a point, fuse for a short length, or are united by a short cross-vein. Hind wing bare. Subgenital plate (fig. 253) apical lobes long, truncate, each with 2 stout and 1 very fine short seta; sclerotization at anterior corners. Sclerotization on main plate complete. Oviduct sclerotized, persistent. Gonapophyses (fig. 254): ventral valve broad basally, tapering apically; outer valve fairly straight, with 3 long marginal setae and shorter setae in apical 1/2. Paraproct with a median transverse row of 5 long setae and 1 seta near mesial margin, and a very small double spine on mesial face. Metric and meristic characters as in Table 23.

♂. *Coloration* (after 26 yr in alcohol): As ♀.

Morphology: Hypandrium (fig. 255) with a small median apical lobe. Penis frame (fig. 256, 257)

Table 23. Metric (in mm) and meristic characters of *Ectopsocus furcatus* (♀) and of 5 ♀♀ and 3 ♂♂ of *E. comptus*.

	E. furcatus	*E. comptus*							
	♀	♀					♂		
B	1.64	1.48	1.62	1.80	1.36	1.48	1.24	–	1.40
A	–	1.000	1.180	1.305	1.095	1.095	1.085	–	1.140
f_1	0.185	0.210	0.235	0.325	0.235	0.240	0.190	0.205	0.225
f_2	0.110	0.145	0.150	0.225	0.150	0.145	0.140	0.125	0.145
Ratio f_1/f_2	1.65	1.45	1.56	1.44	1.57	1.64	1.38	1.63	1.55
Ratio I. O.: D.	5.33	3.38	2.94	3.11	3.42	4.00	2.92	3.33	3.08
Fw	1.24	1.32	1.42	1.54	1.40	1.40	1.18	1.18	1.24
Hw	1.00	1.08	1.14	1.26	1.08	1.10	0.98	0.94	0.98
Hf	0.305	0.300	0.320	–	0.305	0.305	0.265	0.265	0.280
Ht	0.455	0.515	0.565	0.610	0.550	0.555	0.430	0.450	0.470
t_1	0.120	0.170	0.190	0.210	0.190	0.185	0.160	0.160	0.165
t_2	0.075	0.080	0.080	0.085	0.080	0.080	0.075	0.065	0.080
Ratio t_1/t_2	1.55	2.17	2.42	2.46	2.42	2.34	2.18	2.40	2.08
Ct	6	12	15	13	16	15	11	13	13
	8	8	8	8	8	8	8	8	8

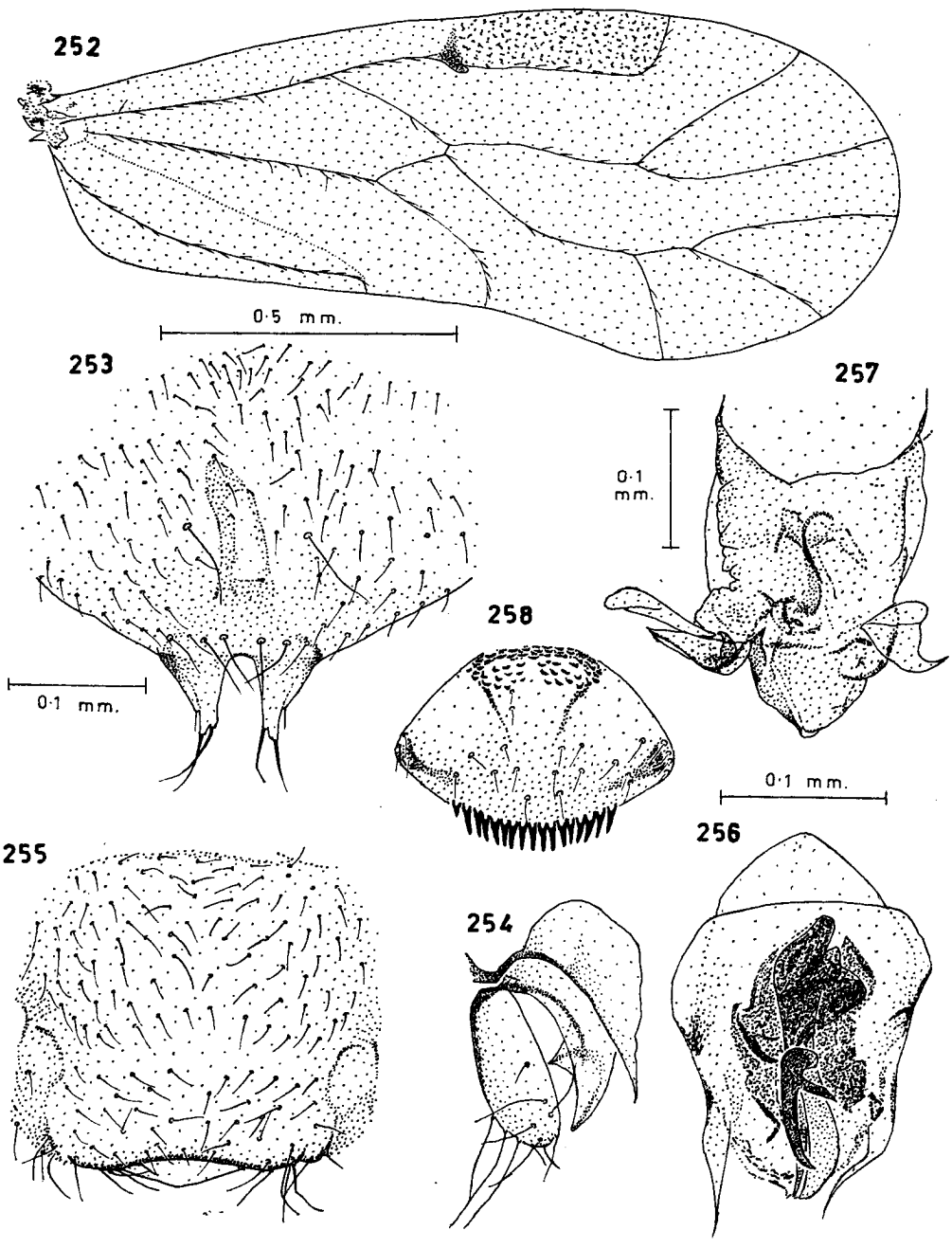


Fig. 252-258. *Ectopsocus comptus* n. sp.: 252, ♀ fore wing; 253, subgenital plate; 254, gonapophyses; 255, hypandrium; 256, penis frame; 257, penis frame with aedeagal sclerites on eversion; 258, ♂ apical abdominal tergite. (253, 255 and 254, 257 and 256, 258 to common scales.)

inner parameres not sclerotized, not fused; 3 radula sclerites. Tergite 9 (fig. 258) trapezoid, lateral margin convex, with apical comb of 14–17 (3 specimens) large teeth, and an apical group of tubercles surrounded on anterior and lateral sides by a line of sclerotization, 2 triangular areas of sclerotization at posterior corners. Metric and meristic characters as in Table 23.

DISTRIBUTION: Samoa.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7975) (tube S5.5, slides S5.5a, b), Sinaele, Upolu, Samoa, 430 m, 24.VI.1940, Zimmerman; allotype ♂ (tube S4.3, slides S4.3a, b), Fugasa Trail, Tutuila, Samoa, 11.VII.1940, Zimmerman; paratype ♂, (tube S4.4, slides S4.4a, b), same collecting data as allotype ♂; other paratypes: 2 ♀♀, same collecting data as allotype ♂; other specimens collected by Zimmerman in Samoa: 3 ♀♀, Afiamalu, Upolu, 670 m, 8.VI.1940; 1 ♀, Amouli, Tutuila, 100 m, 2.VIII.1940; 1 ♀, Malololelei Rd., Upolu, 8.VII.1940; 2 ♀♀, Afiamalu, Upolu, 10.VII.1940; 1 ♀, same locality, 430 m, 11.VII.1940; 1 ♂, Moloata, 200 m, 27.VIII.1940.

E. comptus closely resembles *E. fullawayi* End. (Hawaii, Fiji, Samoa, Tubuai, Rapa, Tuamotu) in genitalic characters though not in fore wing pattern. The strong sclerotization on the lining of the subgenital plate is absent, and the anterior group of tubercles on tergite 9 is indistinctly separated into 2 groups.

Ectopsocus denervus Thornton and Wong, new species

See p. 95.

Ectopsocus gradatus Thornton and Wong, new species

♀. *Coloration* (after 26 yr in alcohol): Head light buff, usual pattern very light brown. Clypeus with indistinct striae. Maxillary palp very light brown. Antenna: scape and pedicel very light brown, flagellum slightly paler. Ocelli pale. Eyes brown. Thoracic sclerites buff. Leg: very light brown, except trochanter and femur cream. Fore wing (fig. 259) very light brown; veins light brown. Hind wing paler; veins light brown, fading towards apex. Abdomen cream.

Morphology: Setae on head long. Fore wing (fig. 259) marginal setae very fine, short, extra row from *sc* to r_{4+5}; setae on veins short, dense; veins *rs* and *m* meet at a point. Hind wing bare. Subgenital plate (fig. 260): apical lobes long, apex blunt, each with 2 short stout and 1 finer seta apically, sclerotization at anterior corners. Main plate with 2 (not 6) subapical long setae. Sclerotization on main lobe complete. On lining 2 heavily sclerotized ridges convergent anteriorly, almost meeting at mid-line. Gonapophyses (fig. 261): ventral valve broad basally, tapering apically; outer valve short, broad, with 5 long marginal setae and short setae on apical 3/4. Paraproct with a median transverse row of 6 long setae and 1 seta near mesial margin, and a small double spine, the individual spines being unequal in length, on mesial face. Metric and meristic characters as in Table 19.

♂. Unknown.

DISTRIBUTION: Samoa

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7976) (tube S25.1, slides S25.1a, b), Afiamalu, Upolu, 680 m, Samoa, 22.VI.1940, Zimmerman; other specimens collected by Zimmerman: 1 ♀, same data, 2.VII.1940; 2 ♀♀, same loc., 5.VII.1940; 1 ♀, same loc., 10.VII.1940; 3 ♀♀, same loc., 11.VII.1940.

E. gradatus resembles *E. fullawayi* End. (Hawaii, Fiji, Samoa, Tubusai, Rapa, Tuamotu) in female genitalia, especially in the heavy sclerotization on the lining of the subgenital plate. The oviduct, however, is not sclerotized nor persistent, and the apical setae on the apical lobe of the subgenital plate are short. *E. gradatus* can be distinguished further from *E. fullawayi* by its unpatterned fore wing.

Ectopsocus ornatoides Thornton and Wong, new species

See p. 103.

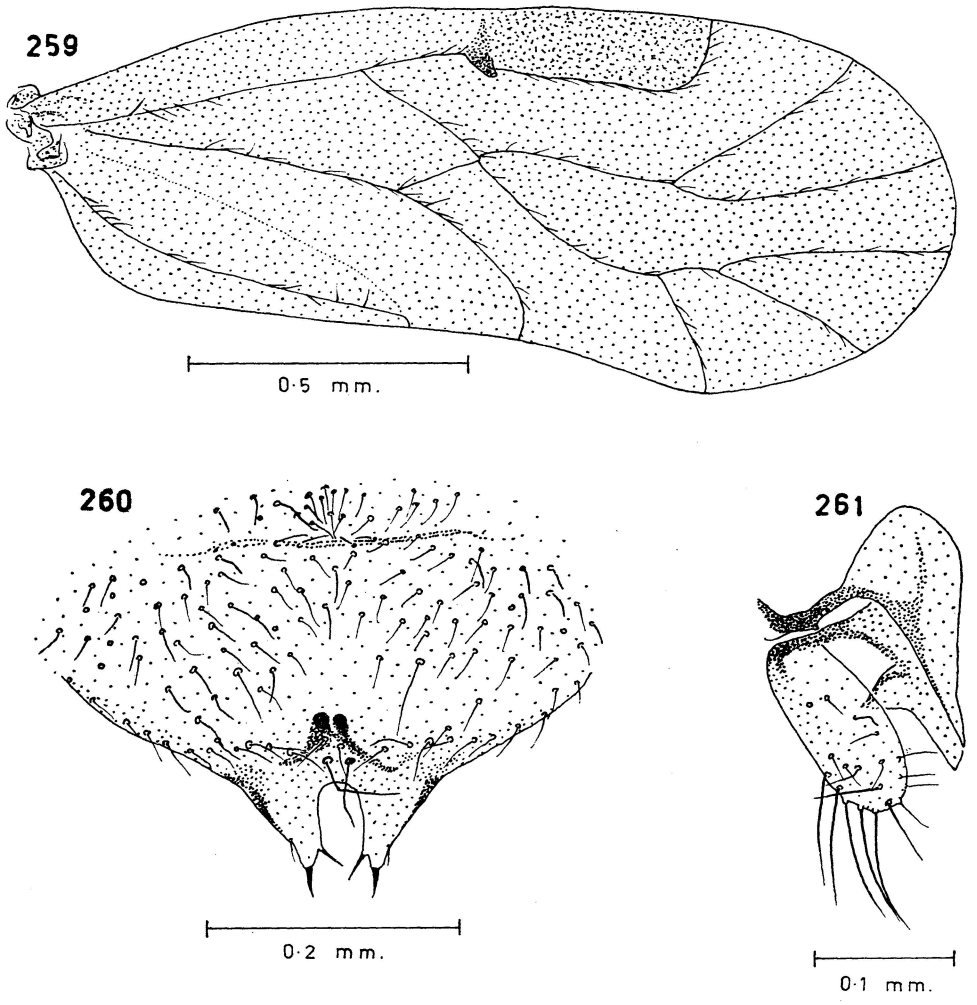


Fig. 259-261. *Ectopsocus gradatus* n. sp. ♀: 259, fore wing; 260, subgenital plate; 261, gonapophyses.

Ectopsocus spilotus Thornton and Wong, new species
See p. 107.

Ectopsocus ignotus Thornton and Wong, new species

♂. *Coloration* (after 26 yr in alcohol): Head cream, usual pattern very light brown, mesial to orbit, and along posterior margin of vertex. Clypeus with indistinct striae. Maxillary palp cream. Antenna segments 1–6 very light brown; rest broken off. Ocelli pale. Eyes brown. Mesothorax pale brown, scutellum slightly darker, cream border to antedorsum and dorsal lobes. Metathoracic terga similar. Thoracic pleura pale brown. Leg: pale brown, except trochanter and femur cream. Fore wing (fig. 262) very light brown, darker in cells Cu_2 and *An*; veins darker, bordered pale. Hind wing almost hyaline; veins slightly darker, *cu* light brown.

Morphology: Fore wing (fig. 262) marginal setae microscopic, extra row from *sc* to r_{4+5}; setae on veins short, fairly dense; pterostigma granulation fine, broader apically, apex bluntly angulate; veins *rs* and *m* united by a very short cross-vein; *r* fork divergent, fairly straight, hence cell R_3 triangular. Hind wing with 5 very fine, very short marginal setae between *r* fork. Hypandrium and tergite 9 accidentally lost. Penis frame (fig. 263) inner parameres not sclerotized; 3 radula sclerites, median one blunt, arrangement symmetrical, forming a tube. Metric and meristic characters as in Table 27.

♀. Unknown.

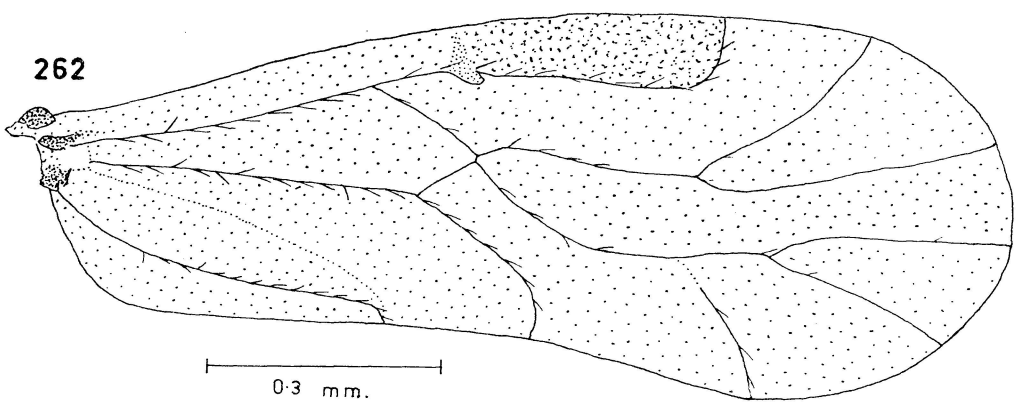
DISTRIBUTION: Samoa.

MATERIAL EXAMINED: Holotype ♂ (BISHOP 7977) (tube S45.3, slides S45.3a, b), Afiamalu, Upolu, 680 m, Samoa, 8.VI.1940, Zimmerman.

Ectopsocus ignotus has a fore wing without pattern as most of the *Ectopsocus* species, but a peculiar penis frame. In the present state of knowledge it is difficult to place it in any of the existing groups.

Ectopsocus zimmermani Thornton and Wong, new species

♂. *Coloration* (after 26 yr in alcohol): Head light buff, markings indiscernible. Maxillary palp light buff. Antenna pale brown. Ocelli pale. Eyes brown. Thorax light buff, markings indistinct. Leg:



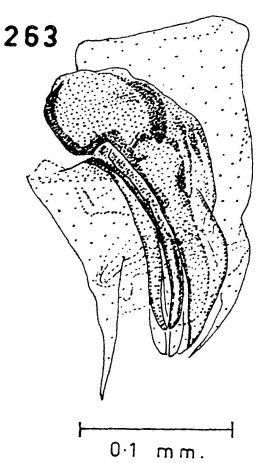


Fig. 262-263. *Ectopsocus ignotus* n. sp. ♂: 262, fore wing; 263, penis frame.

basal segments cream, tibia and tarsal segments pale brown. Fore wing (fig. 264) with uneven pale brown pigment on membrane, darker along *rs* and *m* basal to, at, and just beyond fusion; and along all vein apices; veins light brown. Hind wing almost hyaline, veins slightly darker. Abdomen cream.

Morphology: Fore wing (fig. 264) margin bare; setae on veins short, sparse; veins *rs* and *m* fuse for a short length or meet at a point. Hind wing bare. Hypandrium (fig. 265) simple. Penis frame (fig. 266) hardly sclerotized; 2 pointed radula sclerites. Tergite 9 (fig. 267) broad, trapezoid, lateral margin convex with apical comb of 20 (2 specimens) strong mesially directed teeth and anterior median group of tubercles; a sclerotized band surrounding group of tubercles, except posteriorly. Metric and meristic characters as in Table 24.

♀. Unknown.

DISTRIBUTION: Samoa.

MATERIAL EXAMINED: Holotype ♂ (BISHOP 7978) (tube S27.5, slides S27.5a, b), Naval Station, Tutuila, 15.VIII.1940, Zimmerman; paratype 1 ♂, same collecting data; 1 ♂, Moloata, 210 m, 27.VIII.1940, Zimmerman, Samoa.

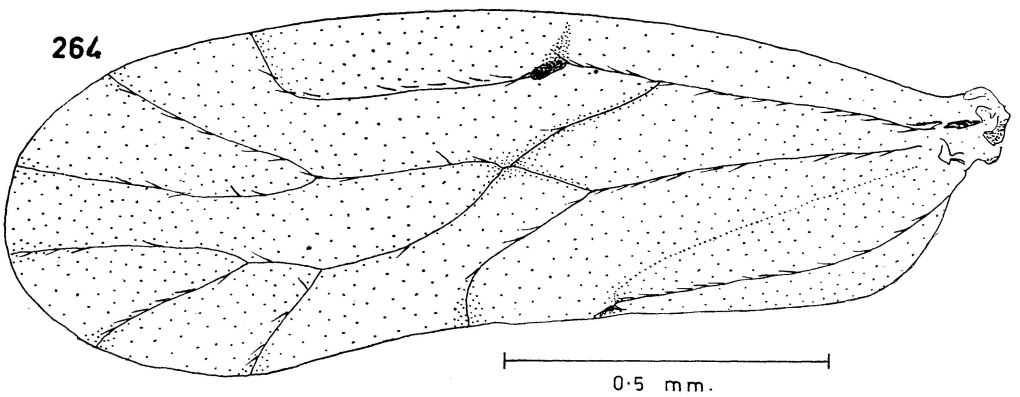
E. zimmermani shows some resemblance to members of the *ornatus* group in tergite 9 ornamentation. It differs in wing pattern, in that the hypandrium does not have a small median apical lobe and in the penis frame which lacks sickle-shaped sclerites. The fore wing pattern resembles that of the *briggsi* group but differs in having pigmentation along *r* and *m* basal to their fusion.

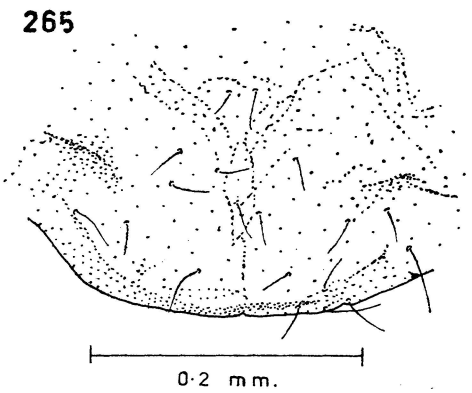
Table 24. Metric (in mm) and meristic characters of 3 ♂♂ of *Ectopsocus zimmermani*, and of 4 ♀♀ and 2 ♂♂ of *Peripsocus nitens*.

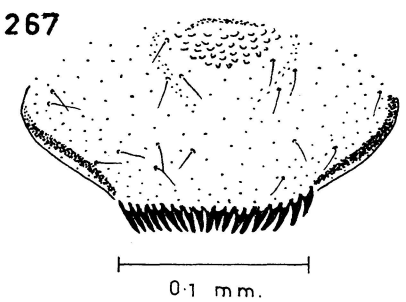
	E. zimmermani			*P. nitens*					
	♂			♀				♂	
B	–	–	–	2.32	2.28	2.02	2.48	1.68	–
A	1.860	–	–	–	–	–	–	–	–
f_1	0.405	0.425	–	–	–	–	–	–	–
f_2	0.285	0.290	–	–	–	–	–	–	–
Ratio f_1/f_2	1.49	1.45	–	–	–	–	–	–	–
Ratio I. O.: D.	1.45	1.39	–	4.62	4.80	4.56	4.62	2.32	2.20
Fw	1.46	1.46	1.42	2.12	2.12	2.14	2.14	1.98	2.00
Hw	1.20	–	1.16	1.68	1.64	1.62	1.68	1.52	1.56
Hf	0.360	0.360	–	0.490	0.490	0.505	0.495	0.465	0.475
Ht	0.605	0.610	–	0.900	0.910	0.900	0.910	0.835	0.875
t_1	0.230	0.240	–	0.250	0.240	0.240	0.240	0.250	0.265
t_2	0.075	0.075	–	0.120	0.080	0.100	0.110	0.110	0.110
Ratio t_1/t_2	3.18	3.28	–	2.12	3.00	2.40	2.12	2.24	2.36
Ct	16	17	–	7	10	5	10	17	15
Tr	8	–	8	22	22	22	21	31	28

Ectopsocus dialeptus Thornton and Wong, new species

♀. *Coloration* (after 4 yr in alcohol): Vertex light brown, usual pattern grayish brown. A slight darkening anterior to ocelli. Clypeus with indistinct striae. Anteclypeus cream. Labrum and gena light brown. Maxillary palp cream. Antenna: scape brown; pedicel light brown; basal flagellar segment light brown in basal 1/2, darker towards apex; rest of flagellum darkens towards apex. Ocelli pale, central margin dark brown, on brown protuberance. Eyes black. Mesothoracic terga dark brown, dorsal lobes with light brown anterior and posterior margins, sutures distinct, dark brown. Metathoracic terga brown, markings similar. Thoracic pleura dark brown. Leg: very light brown, except basal 1/2 of coxa brown. Fore wing (fig. 268) brown, base of cells *R*, Cu_1, and Cu_2 hyaline, a wide, hyaline longitudinal band basal and apical to stigmasac and semicircular hyaline areas at margin of cells R_1, R_3, M_1, M_2, M_3, and Cu_1; veins dark brown, except basal portions of $m + cu$ and cu_2 hyaline, bordered light brown except at apices. Hind wing with







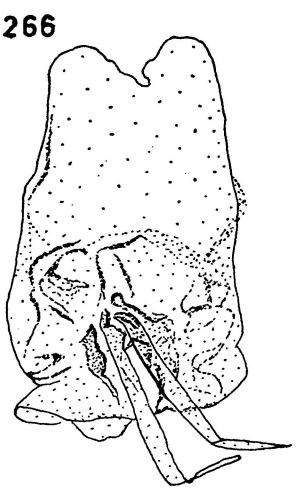


Fig. 264-267. *Ectopsocus zimmermani* n. sp. ♂: 264, fore wing; 265, hypandrium; 266, penis frame; 267, apical abdominal tergite. (266, 267 to common scale.)

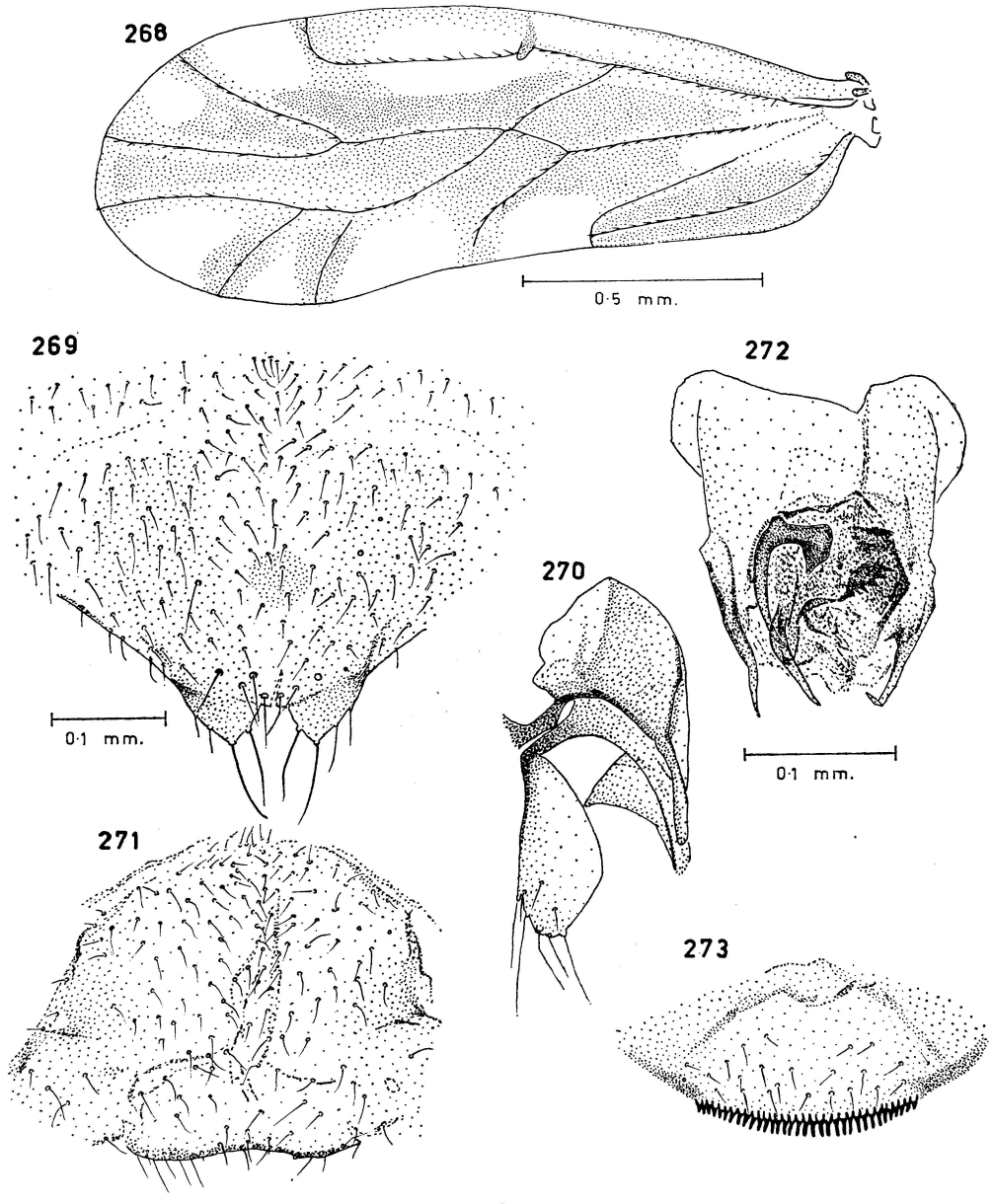


Fig. 268-273. *Ectopsocus dialeptus*: 268, ♀ fore wing; 269, subgenital plate; 270, gonapophyses; 271, hypandrium; 272, penis frame; 273, ♂ apical abdominal tergite. (269, 271 and 270, 272, 273 to common scales.)

light brown longitudinal band in similar position to that in fore wing; veins dark brown, fading towards apical and posterior margins. Abdomen cream.

Morphology: Fore wing (fig. 268) marginal setae very fine, very short; setae on veins short, dense; veins *rs* and *m* meet at a point, fuse for a short length, or are united by a short cross-vein. Hind wing bare; vein *m* curves towards anterior margin, subparallel to r_{4+5}. Subgenital plate (fig. 269) apical lobes broadly triangular, each with 2 stout long and 2 finer shorter setae; sclerotization at anterior corners. Sclerotization on main plate as 2 divergent patches, on lining as a central rounded spot. Gonapophyses (fig. 270): ventral valve broad basally, tapering to a point; outer valve very dilated subapically, very narrow at base, apical field of 7–11 (5 specimens) long setae. Paraproct with a median transverse row of 4 long setae and 1 long seta near margin, and a very small double spine on mesial face. Metric and meristic characters as in Table 25.

♂. *Coloration* (after 4 yr in alcohol): As ♀.

Morphology: Hypandrium (fig. 271) simple. Penis frame (fig. 272) inner parameres not fused; 2 pointed radula sclerites. Tergite 9 (fig. 273) broad, trapezoid, lateral margin convex, with apical comb of 33–36 (2 specimens) teeth. Metric and meristic characters as in Table 25.

DISTRIBUTION: Kermadec Is.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7979) (tube K1.1, slides K1.1a, b), Biuel Trail, Raoul I., sweeping, 2.IX.1962, G. A. Samuelson; allotype ♂ (tube K5.1, slides K5.1a, b), Raoul I., on flower of "nightbells", 29.X.1962, Samuelson; 2 ♀♀, 1 ♂, Bell's Ravine, Raoul I. 22, malaise net, 7–12.IX.1962, Samuelson; 2 ♀♀, N. Terrace, Raoul I., seed pods of palm tree, 24.IX.1962, Samuelson.

E. dialeptus resembles *E. gracilis* in fore wing pattern; however, it differs in cell R_5 which is completely pigmented, in the absence of hyaline areas except marginal ones, and in the relative size of the hyaline area at the wing base. The genitalia resemble those of *E. ornatus* Th. (Taiwan, Hong Kong) and its allies; *E. dialeptus* differs, however, in the absence of tubercles on tergite 9 and in the absence of the small median apical lobe on the hypandrium.

Table 25. Metric (in mm) and meristic characters of 5 ♀♀ and 2 ♂♂ of *Ectopsocus dialeptus*, and of 2 ♀♀ of *E. gracilis*.

	E. dialeptus							*E. gracilis*	
	♀					♂		♀	
B	1.40	1.60	1.64	2.32	–	–	–	1.71	–
A	1.135	–	–	1.250	–	–	1.325	–	–
f_1	0.230	0.265	0.250	0.270	–	–	0.270	0.350	0.370
f_2	0.145	0.170	0.160	0 160	–	–	0 180	0.230	0.240
Ratio f_1/f_2	1.59	1.54	1.53	1.71	–	–	1.52	1.52	1.50
Ratio I. O.: D.	3.84	4.00	4.17	4.00	–	2.72	2.86	3.43	3.33
Fw	1.58	1.76	1.70	1.78	1.64	1.64	1.58	1.66	1.70
Hw	1.26	1.40	1.36	1.44	1.32	1.28	1.26	1.36	1.40
Hf	0.330	0.370	0.365	0.365	–	0.350	0.340	0.370	0.385
Ht	0.555	0.645	0.645	0.635	0.595	0.610	0.585	0.585	0.625
t_1	0.210	0.240	0.240	0.225	0.205	0.245	0.240	0.185	0.200
t_2	0.085	0.085	0.095	0.085	0.080	0.095	0.085	0.080	0.085
Ratio t_1/t_2	2.46	2.77	2.57	2.62	2.58	2.65	2.78	2.34	2.31
Ct	15	15	15	13	–	16	16	14	12
Tr	8	7	8	8	8	8	8	8	8

Southeastern Polynesia

Ectopsocus fullawayi Enderlein

See p. 132.

Ectopsocus perkinsi Banks

See p. 118.

Hawaii

Peripsocus similis Enderlein

See p. 22.

Peripsocus ferrugineus Thornton and Wong, new species

See p. 91.

Peripsocus nitens Thornton and Wong, new species

♀. *Coloration* (after 3 months in alcohol): Vertex cream, usual pattern grayish brown, no dots around ocelli. Sagittal suture fine, dark brown. Clypeus closely packed with oblique, distinct, uniformly brown striae, no unmarked area. Anteclypeus brown basally, cream apically. Labrum dark brown. Gena cream. Maxillary palp basal segments pale, terminal segment brown, colorless at joints. Antenna: scape and pedicel brown, flagellum brown, slightly darkening towards apex. Ocelli pale, on dark brown protuberance. Eyes black. Mesothorax with antedorsum brown, a very narrow, often indistinct cream line along mid line, and wider cream lines along posterior margins; dorsal lobes brown, a cream line along posterior margin and a large cream patch in middle of dorsum; scutellum cream. Metathoracic terga similar, marking less distinct. Thoracic pleura brown. Leg: brown, except trochanter and femur cream. Fore wing (fig. 274) cloudy light brown, darker in 2nd 1/4 from base, lighter in center of cells M_1 and M_2; a transverse hyaline band from proximal end of pterostigma to *rs-m* fusion, along M_3 to posterior margin; veins darker than membrane except r_1 and cu_2 and where traversed by hyaline band. Hind wing lighter brown, costal cell darker; veins brown in basal 1/2, fading towards apical and posterior margins. Abdomen cream with diffused dark brown pigmentation in wide incomplete rings. Apical sclerites dark brown.

Morphology: Clypeus shiny. Pterostigma of fore wing very slightly dilated at apex. Hind wing (fig. 275, 276, 277) vein aberration common, expressed as irregular fusion of *rs* and *m* and loss of one branch of *r* fork. Subgenital plate (fig. 278): median apical lobe elongate, flanked by 2 small rounded projections; apical lobe uniformly covered with small setae, lateral margin convex, posterior margin slightly concave, bearing spinelets; sclerotization lateral. Main plate sclerotization in lateral projections and in a broad, flat V-shaped marking, giving an impression of a figure X traversed by a hyaline line. Gonapophyses (fig. 279): ventral valve slender, styliform, subapical recurrent setae very small; outer valve reduced, about 1/3 length of dorsal valve, subrectangular. Paraproct with a dense group of long fine setae on ventral surface. Metric and meristic characters as in Table 24.

♂. *Coloration* (after 3 months in alcohol): As ♀.

Morphology: Paraproct without setae on ventral surface.

Hypandrium (fig. 280) simple, setose. Penis frame (fig. 281) closed, apically produced to a short beak, median radula sclerite with small, short posterior prong, broad triangular anterior prong, lateral prongs hardly projecting beyond base of triangle; lateral radula sclerites slender with long dorsal arms. Abdominal tergite 9 with a small subrectangular posterior projection bearing 11–18 broadly triangular strong teeth in 2 rows (fig. 282). Metric and meristic characters as in Table 24.

DISTRIBUTION: Hawaii, New Zealand.

MATERIAL EXAMINED: Holotype ♀ (BISHOP 7980) (tube H4.6, slides H4.6a, b), Waimea, 820 m, Hawaii, 27.VI.1963, Thornton; allotype ♂ (tube H4.5, slides H4.5a, b), same collecting data; paratypes 3 ♀♀, 1 ♂, same collecting data.

NEW ZEALAND: 1 ♀, 19.2 km NE of Palmerston North, Balance Bridge, 28.III.1960, O'Brien.

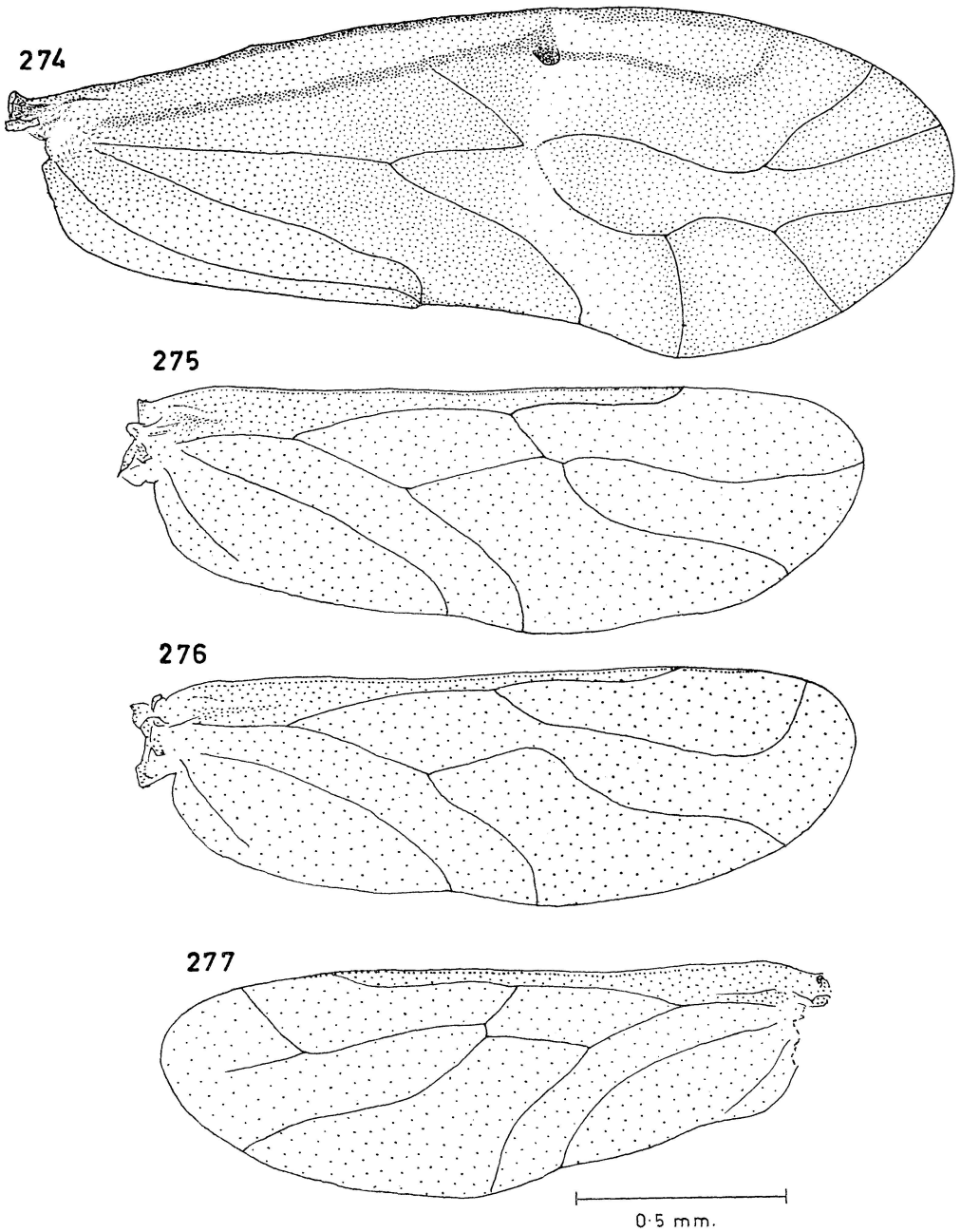


Fig. 274-277. *Peripsocus nitens*: 274, ♀ fore wing; 275, ♀ hind wing; 276, another ♀ hind wing; 277, ♂ hind wing. (All to common scale.)

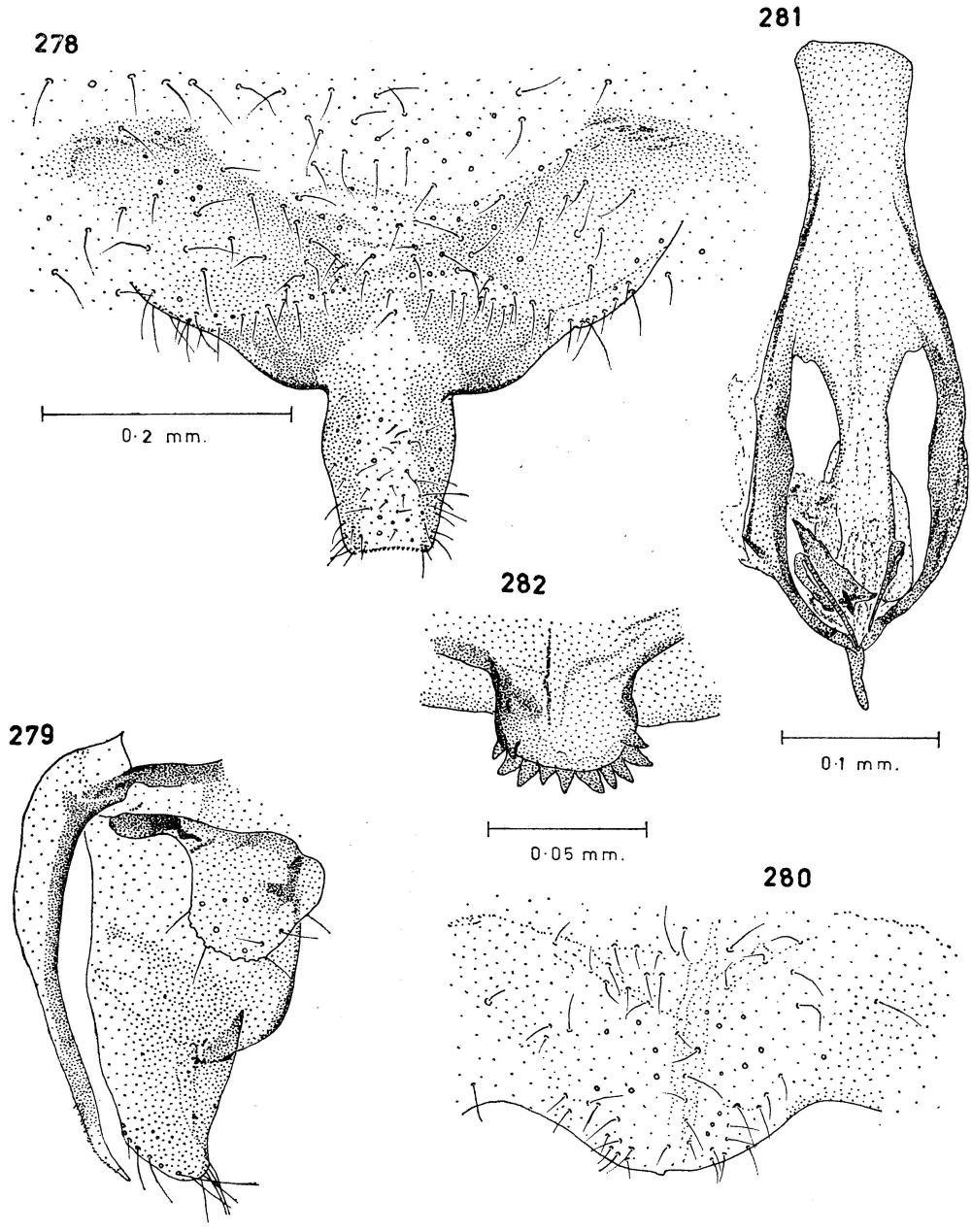


Fig. 278-282. *Peripsocus nitens*: 278, subgenital plate; 279, gonapophyses; 280, hypandrium; 281, penis frame; 282, ♂ caudal comb. (278, 279, 280 to common scale.)

The female gonapophyses and subgenital plate of this species bear a remarkable resemblance to those of *P. reductus* Bad. (Europe) (described from 1 female found in the South of France). In heavily pigmented specimens of *P. nitens* the fore wings often approach the pattern shown by Badonnel, but the hind wings never show a similar intensity of pigmentation. Broadhead & Datta (1960) report the interception of 2 females of *P. reductus* on South African logs in a ship's hold at Liverpool, England. There being no other records of the species in Europe, it is possible that it does not naturally occur there. *P. nitens* is also similar to *P. milleri* (Tillyard) (New Zealand) in wing pattern (described but not figured) and the shining head sclerites, but differs in having distinct striae on the clypeus. The male and female genitalia of *P. nitens* show marked relationship with *P. quercicola* End. (Oriental and Japan) and its allies.

Ectopsocopsis cryptomeriae (Enderlein)

See p. 26.

Ectopsocus fullawayi Enderlein

Ectopsocus fullawayi Enderlein, 1913, Zool. Anz. **41:** 356 (Hawaii; distribution); 1920, Zool. Jahrb. Abt. Syst. **43:** 453 (Hawaii; distribution).— Banks, 1931b, Proc. Hawaii. Ent. Soc. (1927–1930) **7**(3): 437–41 (fig., distribution).— Zimmerman, 1948, Ins. Hawaii **2:** 234 (fig., distribution).— Swezey, 1954, B. P. Bishop Mus. Spec. Publ. **44:** 19.

♀ (further description). *Morphology:* Subgenital plate (fig. 283) apical lobes long, truncate, each with 2 stout and 1 very fine much shorter seta, sclerotization at anterior corners. Sclerotization on main plate complete, on lining 2 heavily sclerotized ridges convergent anteriorly. Oviduct sclerotized, persistent. Gonapophyses (fig. 284): ventral valve very broad basally, tapering apically; outer valve short, broad, with 4 long marginal setae and fine setae in apical 1/2. Paraproct with a median transverse row of 5 long setae and 1 seta near mesial margin, and a very small double spine on mesial face. Metric and meristic characters as in Table 26.

♂ (further description). *Morphology:* Hypandrium (fig. 285) with a small median apical lobe. Penis frame (fig. 286) inner parameres not fused, not sclerotized; 2 radula sclerites, 1 broad, racket-like, the other long, scythe-like. Tergite 9 (fig. 287) with apical comb almost as long as broad, lateral margin convex, of 19–20 (5 specimens) mesially directed teeth, and 2 large groups of stout large tubercles

Table 26. Metric (in mm) and meristic characters of 5 ♀♀ and 5 ♂♂ of *Ectopsocus fullawayi.*

	♀					♂				
B	1.42	1.56	1.76	1.48	1.46	1.34	1.18	1.16	1.24	1.24
A	1.115	1.060	1.140	1.175	1.135	1.145	1.135	1.085	1.125	1.120
f_1	0.230	0.225	0.240	0.240	0.245	0.240	0.225	0.220	0.230	0.225
f_2	0.145	0.140	0.150	0.160	0.145	0.155	0.145	0.140	0.145	0.145
Ratio f_1/f_2	1.59	1.62	1.57	1.50	1.68	1.53	1.55	1.57	1.59	1.55
Ratio I. O.: D.	4.60	4.18	4.36	3.84	4.03	3.17	3.90	3.80	3 17	3.28
Fw	1.28	1.32	1.32	1.32	1.26	1.24	1.14	1.22	1.24	1.26
Hw	1.04	–	1.10	1.04	1.02	1.04	0.94	0.98	1.02	1.00
Hf	0.320	0.320	0.330	0.325	0.310	0.300	0.280	0.290	0.290	0.290
Ht	0.525	0.525	0.545	0.515	0.515	0.505	0.485	0.485	0.470	0.485
t_1	0.185	0.185	0.200	0.200	0.200	0.190	0.190	0.185	0.185	0.185
t_2	0.080	0.080	0.080	0.080	0.075	0.075	0.075	0.075	0.080	0.080
Ratio t_1/t_2	2.33	2.33	2.50	2.50	2.72	2.64	2.64	2.44	2.34	2.34
Ct	13	13	14	13	14	14	13	13	12	14
Tr	8	8	8	8	8	8	8	8	8	8

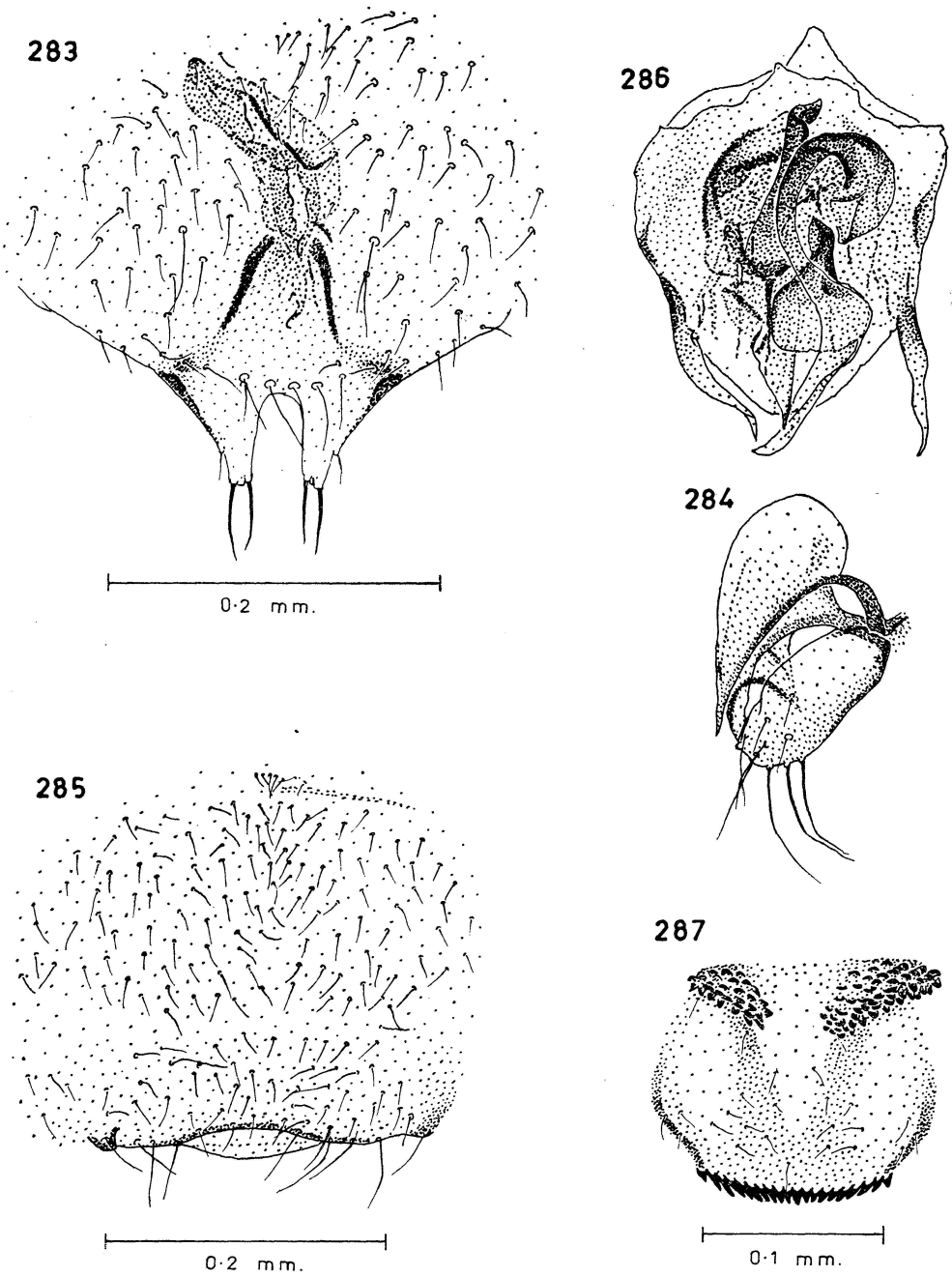


Fig. 283-287. *Ectopsocus fullawayi* Enderlein: 283, subgenital plate; 284, gonapophyses; 285, hypandrium; 286, penis frame; 287, ♂ apical abdominal tergite. (283, 284, 286 to common scale.)

anterolaterally. Metric and meristic characters as in Table 26.

DISTRIBUTION: Hawaii, Fiji, Samoa, Tubuai, Rapa, and Tuamotu Archipelago.

MATERIAL EXAMINED: MICRONESIA: 1 ♀, Peale Is., Wake I., XI.1957, Krauss.

FIJI: 1 ♀, 1 ♂, Vanua Mbalavu, Mvana, 9.VIII.1938.

SAMOA: collected by Zimmerman unless otherwise stated: 4 ♀♀, Sinaeles, Upolu, 430 m, 24.VI.1940; 1 ♀, Afiamalu, Upolu, 5.VII.1940; 2 ♀♀, West Side, Afono Trail, Tutuila, 120 m, 1.VIII.1940; 1 ♀, Afiamalu, Upolu, 10.VII.1940; 2 ♀♀, 1 ♂, Tutuila, Fugasa Trail, 11.VIII. 1940; 2 ♀♀, 1 ♂, Naval Station, Tutuila, 15.VIII.1940, Zimmerman & Swezey; 1 ♀, Utulei, Tutuila, 18.VIII.1940; 1 ♀, Pagatogo, Tutuila, 25.VIII.1940; 7 ♀♀, 3 ♂♂, Moloata, Tutuila, 210 m, 27.VIII.1940; 1 ♀, Pagatogo, Tutuila, 28.VIII.1940.

HAWAII: See Thornton (in press)

AUSTRALS: *TUBUAI:* 5 ♀♀, 5 nymphs, Murivahi, 16.VIII.1934, Zimmerman

RAPA: 1 ♀, 30.VI.1934, Zimmerman.

The female genitalia of *E. fullawayi* resemble those of *E. basalis* Banks (Philippines) differing in the persistent oviduct, the strong sclerotization on the lining of the subgenital plate, and the basally broad outer valve. The male genitalia, however, resemble those of *E. ornatus* Th. (Taiwan, Hong Kong) differing in that the tergite 9 anterior groups of tubercles are lateral and triangular in shape. The penis frame as in most species is distinctive.

Ectopsocus hawaiiensis Enderlein

Ectopsocus hawaiiensis Enderlein, 1913, Zool. Anz. **41:** 356 (distribution); 1920, Zool. Jahrb. Abt. Syst. **43:** 453 (fig.; distribution).— Banks, 1931b, Proc. Hawaii. Ent. Soc. **7**(3): 438 (distribution); 1942, Bull. B. P. Bishop Mus. **172:** 27 (distribution).— Zimmerman, 1948, Ins. Hawaii **2:** 235 (fig., distribution).

?DISTRIBUTION: Hawaii, Samoa, Guam.

Specimens in the H. S. P. A. collection labeled *E. hawaiiensis* are actually *E. ornatoides* (see page 103). It is possible that all clear-winged species of *Ectopsocus* have been identified with this species in Hawaii. Enderlein provided no information on genitalic characters, and the type is not available for dissection.

According to Zimmerman, the species is also found in Guam and Samoa.

Ectopsocus maindroni Badonnel

See p. 13.

Ectopsocus meridionalis Ribaga

See p. 28.

Ectopsocus perkinsi Banks

See p. 118.

Ectopsocus richardsi (Pearman)

See p. 29.

Ectopsocus ornatoides Thornton and Wong, new species

See p. 103.

Ectopsocus spilotus Thornton and Wong, new species

See p. 107.

AUSTRALIAN REGION

New Zealand Subregion

Peripsocus maoricus (Tillyard)

Peripsocopsis maoricus Tillyard, 1923, Trans. N. Z. Inst. **54:** 194 (fig., type).

Distribution: New Zealand.

Peripsocus milleri (Tillyard)

Peripsocopsis milleri Tillyard, 1923, Trans. N. Z. Inst. **54:** 195 (fig., distribution).— Hickman, 1934, Occ. Pap. R. Soc. Tasmania **1933:** 87 (distribution).

Distribution: New Zealand, Tasmania.

Peripsocus morulops (Tillyard)

Peripsocopsis morulops Tillyard, 1923, Trans. N. Z. Inst. **54:** 194 (fig., distribution).

Distribution: New Zealand.

Peripsocus nitens Thornton and Wong, new species

See p. 129.

Ectopsocus briggsi McLachlan

See p. 93.

Ectopsocus congener Tillyard

Ectopsocus congener Tillyard, 1923, Trans. N. Z. Inst. **54:** 192 (fig., distribution).— Hickman, 1934, Occ. Pap. R. Soc. Tasmania **1933:** 87 (distribution).

Distribution: New Zealand, Tasmania.

Ectopsocus gracilis Thornton and Wong, new species

♀. *Coloration* (after 6 yr in alcohol): Head dark brown, lighter towards anterior margin of clypeus. Sagittal suture very dark brown. Anteclypeus and labrum very light brown. Gena brown, a dark brown band between orbit and antennal socket. Maxillary palp cream. Antenna: scape and pedicel dark brown, flagellum cream. Ocelli pale. Eyes black. Mesothorax: pronotum and dorsal lobes dark brown, a lighter spot at center of notum and lighter posterior margin to dorsal lobes; scutellum very dark brown; sutures very dark brown. Metathoracic terga similar. Thoracic pleura dark brown. Leg: cream. Fore wing (fig. 288) hyaline with a dark brown patch in apical 1/2 of cells Cu_2 and *An*, continuing obliquely anteriorly, but lighter, to middle of cell *R*; an oblique longitudinal dark brown patch from base of cell R_5 to margin of R_3 with narrow branches along marginal veins, wing base light brown; veins dark brown, except section of r_1 beyond stigmasac, basal section of cu_2 and middle section *an*, bordered almost hyaline. Hind wing hyaline with light brown markings in similar positions to those of fore wing. Abdomen cream.

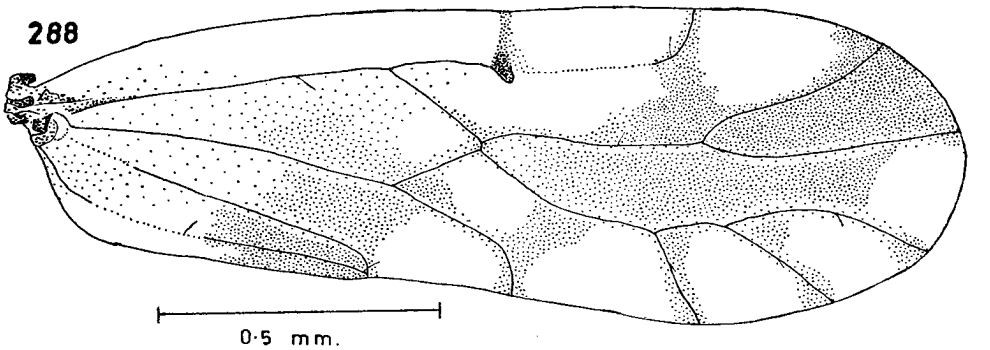
Morphology: Fore wing (fig. 288) unusually narrow, hardly broadened subapically; marginal setae microscopic, very fine, short, an extra row from *sc* to m_1; setae on veins fairly long, sparse; veins *rs* and *m* either meet at a point or are united by a short cross-vein. Hind wing with 15–18 (2 specimens) marginal setae between r_1 and m_1. Subgenital plate (fig. 289): lateral apical lobes long, narrow, curved mesially, each bearing a strong seta at apex and 3 finer setae on outside margin; sclerotization complete. Sclerotization on main plate lateral and 4 very dark brown patches apically, the smaller 2 at base of apical lobes. Gonapophyses (fig. 290): ventral valve styliform, straight, well sclerotized; dorsal valve absent; outer valve with 3 stout setae and a few finer setae in apical 1/2. Paraproct with a median transverse row of 3 long setae, and a small double spine on mesial face. Metric and meristic characters as in Table 25.

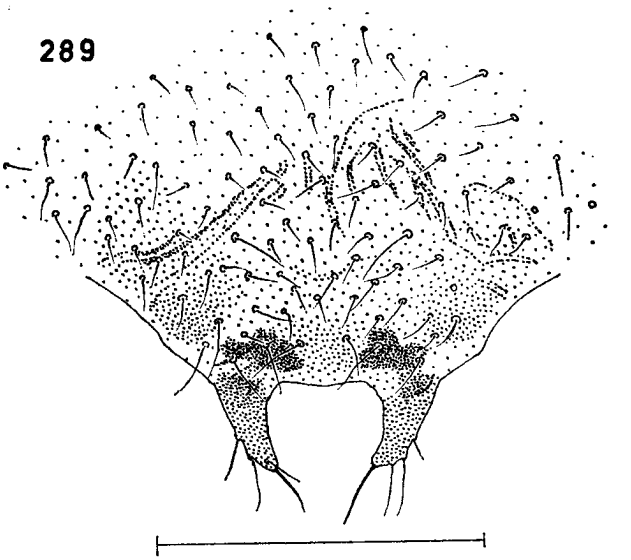
♂. Unknown.

Distribution: New Zealand.

Material Examined: Holotype ♀ (Bishop 7981) (tube NZ8.1, slides NZ8.1a, b), Auckland Cascades, Waitakere, New Zealand, 26.II.1960, Gressitt; paratype 1 ♀, same collecting data.

The species has some similarity in wing pattern to *E. dialeptus* (Kermadecs) but differs in that





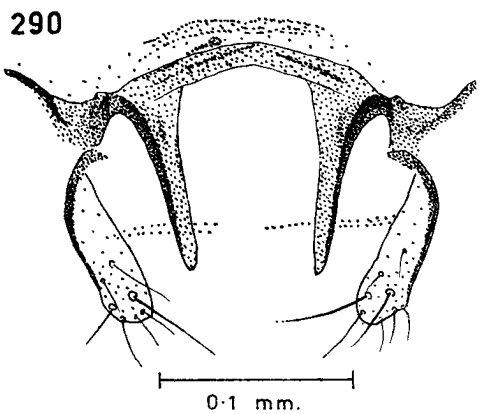


Fig. 288-290. *Ectopsocus gracilis* ♀: 288, fore wing; 289, subgenital plate; 290, gonapophyses.

cell R_3 is completely pigmented, R_5 has a semicircular hyaline marginal mark, and cell *An* is hyaline basally. The female genitalia show similarity to the *briggsi* group which has 3 representatives in New Zealand. The gonapophyses, however, are unique in the absence of dorsal valves.

Ectopsocus punctatus Thornton and Wong, new species

♀. *Coloration* (after 6 yr in alcohol): Vertex light brown, usual pattern grayish brown. Sagittal suture brown. Frons light brown. Clypeus light brown with brown oblique striae. Anteclypeus and labrum colorless. Gena light brown, a brown patch between orbit and antennal socket. Maxillary palp light brown, darkening towards apex. Antenna: scape and pedicel brown, flagellum light brown. Ocelli pale, on light brown protuberance. Eyes black. Mesothorax: pronotum brown with light brown posterior margin; a light brown spot at center of notum, dorsal lobes with light brown posterior margin; scutellum brown; sutures brown. Metathoracic terga similar. Thoracic pleura brown. Leg: light brown. Fore wing (fig. 291) almost hyaline, with a small, dark chocolate brown spot at ends of pterostigma and at *rs-m* junction, and a small brown spot at end of veins; veins brown except cu_2 hyaline. Hind wing almost hyaline; veins brown except cu_2 and *an*, a faint small brown spot at end of r_{4+5}, *m* and *cu*. Abdomen cream with brown transverse bands dorsally.

Morphology: Clypeus bluntly triangular. Fore wing (fig. 291) marginal setae very short, fine, extra row from *sc* to m_1; setae on veins fine, short; veins *rs* and *m* either meet at a point or are fused for a very short distance. Hind wing with 4–7 (5 specimens) very fine, short marginal setae between *r* fork; Subgenital plate (fig. 292) lateral apical lobes long, narrow, curved mesially, each bearing 3 fine setae subapically; a small shallow rounded median lobe. Sclerotization on main plate as 2 lateral subparallel lines, on lining as a sheet with 2 semicircular strongly sclerotized areas laterally. Gonapophyses (fig. 293): ventral and dorsal valves reduced, outer valve curved mesially, with a small number of fine setae. Paraproct with a median transverse row of 4 long setae, and a very small double spine on mesial face. Metric and meristic characters as in Table 27.

♂. *Coloration* (after 6 yr in alcohol): As ♀.

Morphology: Hind wing margin with 8–12 (3 specimens) very fine, short setae between *r* fork. Hypandrium (fig. 294) simple, setose. Penis frame (fig. 295) inner parameres fused with apical lateral pointed projection, and 1 thimble-shaped lobe; radula sclerites not detectable. Tergite 8 (fig. 296) with large median

Table 27. Metric (in mm) and meristic characters of *Ectopsocus ignotus* (♂), and of 5 ♀♀ and 3 ♂♂ of *E. punctatus*.

	E. ignotus	*E. punctatus*							
	♂	♀					♂		
B	1.18	1.96	–	2.00	1.86	–	1.78	1.84	1.58
A	–	–	–	–	1.595	1.595	–	–	–
f_1	0.200	0.385	0.400	0.365	0.370	0.370	0.320	0.435	0.320
f_2	0.140	0.250	0.265	0.250	0.240	0.250	0.220	0.290	0.210
Ratio f_1/f_2	1.43	1.53	1.50	1.45	1.51	1.48	1.46	1.50	1.50
Ratio I. O.: D.	3.92	4.15	3.75	4.15	4.15	4.15	3.07	2.40	2.88
Fw	1.26	2.16	2.06	2.08	1.84	2.00	1.94	2.46	1.84
Hw	1.02	1.64	1.58	1.62	1.46	1.54	1.52	1.90	1.42
Hf	0.265	0.395	0.425	0.405	0.370	0.450	0.345	0.410	0.345
Ht	0.450	0.730	0.755	0.715	0.690	0.675	0.675	0.810	0.625
t_1	0.165	0.225	0.245	0.225	0.225	0.210	0.225	0.265	0.210
t_2	0.065	0.100	0.095	0.095	0.085	0.080	0.085	0.095	0.080
Ratio t_1/t_2	2.50	2.37	2.57	2.43	2.62	2.67	2.62	2.86	2.67
Ct	12	13	14	13	14	13	15	17	15
Tr	–	8	8	8	8	10	8	8	8

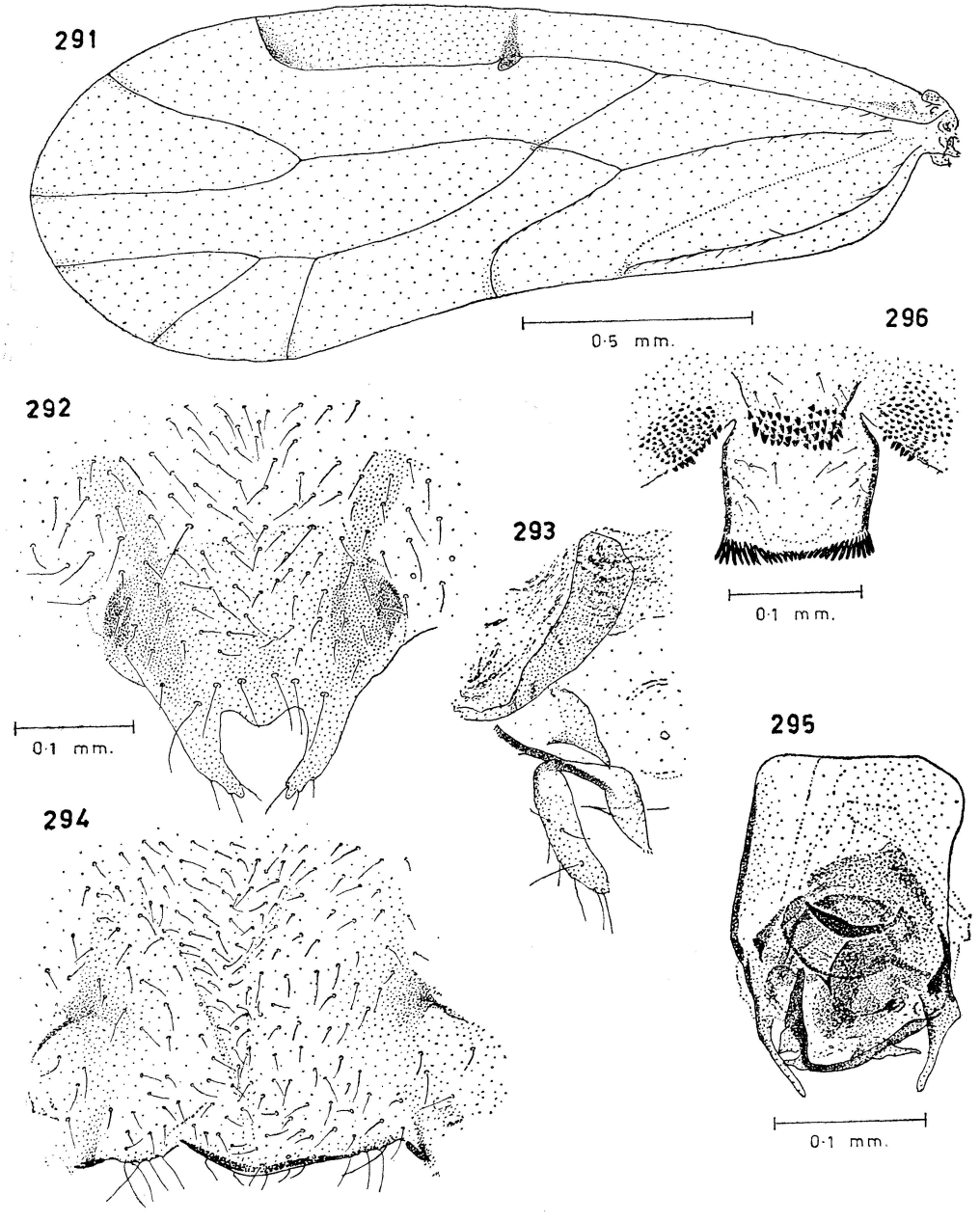


Fig. 291-296. *Ectopsocus punctatus*: 291, ♂ fore wing; 292, subgenital plate; 293, gonapophyses; 294, hypandrium; 295, penis frame; 296, ♂ apical abdominal tergites. (292, 294 and 293, 296 to common scales.)

and lateral groups of pointed tubercles. Tergite 9 (fig. 296) slightly longer than broad, lateral margin convex, with an apical comb of 26–30 (3 specimens) small slender teeth. Metric and meristic characters as in Table 27.

DISTRIBUTION: New Zealand.

MATERIAL EXAMINED: Holotype ♀ (tube NZ7.7, slides NZ7.7a, b), Nguongotaha Mt., Rotonia, Auckland Prov., New Zealand, 2.IV.1960, O'Brien; allotype ♂ (BISHOP 7982), (tube NZ2.2, slides NZ2.2a, b), Balance Bridge, 19.2 km NE of Palmerston, 28.III.1960, O'Brien; paratypes 3 ♀♀, 1 ♂, same collecting data as holotype.

NEW ZEALAND: 1 ♂, 24 km NE of Palmerston, Pohangina Val., N. I., 29.III.1960, O'Brien; 1 ♀, Lake Oka Taimar, 18 km E of Rotorua Prov., 2.IV.1960, O'Brien; 2 ♀♀, East Bourne, Butterfly Track, Wellington, 17.II.1962, K. Wise.

E. punctatus resembles most closely *E. briggsi* McLachlan (widespread), and *E. froggatti* End. (Australia, Tasmania) in fore and hind wing pattern and genitalic characters. However, differs in the apical lobes of the subgenital plate being more curly, in the presence of a large fold of sclerotization anterior to the gonapophyses, in the presence of 1 thimble-shaped lobe only on the inner parameres, and in the larger field of, and larger size of tubercles on tergite 8. *E. congener* Tillyard (New Zealand) has simi-larly patterned fore wing but unpatterned hind wing the genitalic characters are, however, unknown.

PALEARCTIC REGION

Japan

Peripsocus didymus Roesler

Peripsocus didymus Roesler, 1939b, Zool. Anz. **125:** 170, fig. 12–15.— Badonnel, 1943, Faune Fr. **42:** 93, fig. 241–43 (further description; distribution).— Obr, 1948a, Sborn. Kl. Přir. Brně. **28:** 65, fig.; 1948b, Publ. Fac. Sci, Univ. Masaryk **306:** 65, fig. 117–18 (distribution).— Nyholm, 1950, Ent. Tidskr. **71:** 198 (distribution), fig. 1B, 2B, D.—Pearman, 1951, Ent. Mon. Mag. **87:** 88, fig. 6 (distribution).—Obr., 1951, Publ. Fac. Sci. Univ. Masaryk **330:** 212 (distribution).— Beaumont, 1952, Bull. Soc. Vaud. Sci. Nat. **65:** 293 (distribution).— Nyholm, 1953, Ent. Tidskr. **74:** 111 (distribution).— Obr, 1958, Sborn. Kl. Přir. Brne **30:** 57 (distribution).— Broadhead & Datta, 1960, Trans. Soc. Brit. Ent. **14**(5): 134, fig. 2, 6, 7, 10, 11, 14 (distribution, ecology)

Peripsocus didymus subsp. *silesiaca* Obr, 1948a, Sborn. Kl. Přir. Brně **28:** 65, fig.; 1949, Sborn Přir. Spolec. Mor. Ostrave. **10:** 3 (distribution); 1958, Sborn. Kl. Přir. Brne **30:** 57

Peripsocus didymus sub. sp. *truncatus* Badonnel, 1943b, Faune Fr. **42:** 93, fig. 230B, 234B (♀).— Pearman, 1951, Ent. Mon. Mag. **87:** 88, fig. 5 (distribution; raised to species).

DISTRIBUTION: Japan, Europe

MATERIAL EXAMINED: JAPAN: 3 ♀♀, 2 ♂♂, Nikko, from *Cryptomeria japonica*, 17.VIII. 1961, Thornton.

Peripsocus ignis Okamoto

Peripsocus ignis Okamoto, 1910, Ann. Hist. Nat. Mus. Hung. **8:** 187 (distribution; Japan).— Karny, 1925, Sarawak Mus. J. **8:** 74 (distribution; Sarawak).— Soehardjan, 1958, Idea **11**(1): 25–32.— Thornton, 1959, Proc. R. Ent. Soc. Lond. **28**(3–4): 37; 1962, Trans R. Ent. Soc. Lond. **114**(9): 285.

DISTRIBUTION: Borneo, Japan.

Peripsocus pumilis Enderlein

Peripsocus pumilis Enderlein, 1907b, Stett. Ent. Ztg. **68:** 99 (distribution; Japan).— Okamoto, 1910, Ann. Hist. Nat. Mus. Hung. **8:** 189 (distribution; Japan).

DISTRIBUTION: Japan.

Peripsocus quercicola Enderlein
See p. 11.
Ectopsocopsis cryptomeriae Enderlein
See p. 26.
Ectopsocus flaviceps (Okamoto)
Micropsocus flaviceps Okamoto, 1910, Ann. Hist. Nat. Mus. Hung. **8:** 190 (distribution).
DISTRIBUTION: Japan
Ectopsocus maindroni Badonnel
See p. 13.
Ectopsocus meridionalis Ribaga
See p. 28.

NEOTROPICAL REGION

Galapagos

Peripsocus pauliani Badonnel
See p. 20.
Ectopsocus maindroni Badonnel
See p. 13.
Ectopsocus richardsi (Pearman)
See p. 29.

AIR-BORNE

Ectopsocopsis cryptomeriae Enderlein
See p. 26.
Ectopsocus briggsi McLachlan
See p. 93.
Ectopsocus cinctus Thornton
See p. 13.
Ectopsocus maindroni Badonnel
See p. 13.

The number of species of each genus reported from each area of the Oriental Region and the Pacific Ocean is summarized in Table 28.

CHARACTERISTICS OF SPECIES-GROUPS

Certain species groups are recognizable from the above study. The grouping is in close agreement with the result (Thornton & Wong 1967) obtained by using numerical taxonomic methods in the evaluation of relationships among species. The characteristics of the species groups are described below:

Ornatus group: Sexual dimorphism marked in both antennal and eye characteristics; fore wing margin bare; marginal semicircular hyaline marks in marginal cells; pterostigma broader apically; hind wing bare; subgenital plate with apical lobes broadly triangular with 2 stout and 2 finer setae; gonapophyses ventral valve very broad and rounded basally, outer valve broadened subapically; paraproct of ♀ with a median transverse row of 5 long setae and a long seta near mesial margin; hypandrium with small apical lobe; penis frame with inner parameres not fused, most species with a double-pronged sickle-shaped radula sclerite; tergite 9 of ♂ trapezoid, convex apical comb with

Table 28. Number of species of Peripsocidae in various areas of the Oriental Region and the Pacific Ocean.

Area	*Ectopsocopsis*	*Ectopsocus*	*Peripsocus*	Total
India	–	5	2	7
Ceylon	–	3	–	3
Nepal	–	1	–	1
China	–	–	1	1
Hong Kong	1	8	10	19
Taiwan	1	2	2	5
Malaya	1	12	11	24
Singapore	–	–	2	2
Cambodia	–	1	–	1
Vietnam	–	2	2	4
Java	–	3	3	6
Borneo	–	1	–	1
Sarawak	–	–	1	1
Palawan	–	5	2	7
Philippines	–	8	1	9
New Guinea	–	8	3	11
Bismarck Archipelago	–	2	–	2
Micronesia	1	17	3	21
Fiji	–	7	1	8
Samoa	–	9	1	10
Kermadecs	–	1	–	1
Southeastern Polynesia	–	2	–	2
Hawaiian Is.	1	7	3	11
New Zealand	–	4	4	8
Japan	1	3	4	8
Galapagos	–	2	1	3
Air-borne	1	3	–	4

large teeth, and an apical group of tubercles. *E. ornatus, E. ornatoides, E. spilotus, E. dialeptus* (no tubercles on tergite 9).

Fullawayi group: Sexual dimorphism evident in antennal and eye characteristics; fore wing margin with an extra row of setae from *sc* to r_{4+5} or m_1; pterostigma broader apically; hind wing bare; subgenital plate with apical lobes long, narrow, each with 2 stout and 1 finer seta; oviduct sclerotized, persistent in some species; gonapophyses ventral valve very broad and rounded basally, outer valve lateral margin almost straight; paraproct of ♀ with a median transverse row of 5 long setae and a long seta near mesial margin; hypandrium with a small apical lobe; penis frame with inner parameres not fused; tergite 9 of ♂ as long as broad, with convex apical comb and 2 anterior groups of tubercles. *E. fullawayi, E. comptus, E. gradatus.*

Perkinsi group: Sexual dimorphism slight; fore wing margin bare; pterostigma broader basally; hind wing margin bare; subgenital plate with apical lobes broadly triangular with 2 stout and 2 finer setae; gonapophyses ventral valve very broad and rounded basally, outer valve with lateral margins straight; paraproct of ♀ with a median transverse row of 4 long setae; hypandrium simple; penis frame with inner parameres not fused; no forked sclerites; tergite 9 of ♂ very broad with straight apical comb. *E. perkinsi*, other species assignable is *E. pearmani.*

Basalis group: Sexual dimorphism marked, evident in antennal and eye characteristics; fore wing brown with hyaline spots; margin with extra row of setae from *sc* to r_{4+5} or m_1; pterostigma

slightly broader apically; hind wing bare; vein r_{2+3} recurved; subgenital plate with subapical setae more than 6, apical lobes each with 2 stout and 1 finer seta; gonapophyses with ventral valve broad basally, outer valve broadened subapically; paraproct of ♀ with a median transverse row of 5 long setae and a long seta near mesial margin; penis frame with inner parameres fused to a broad plate; tergite 9 of ♂ very broad, with straight apical comb. *E. basalis*, *E. nidicolus*, *E. speciosus*, *E. stictus*, *E. baliosus* (inner parameres not fused).

Fenestratus group: Sexual dimorphism apparent in antennal and eye characteristics; fore wing brown with hyaline spots: margin with extra row of setae between *sc* and r_{4+5}; pterostigma broader apically; hind wing bare; subgenital plate with apical lobes with 3 stouter and 2 finer setae on lateral margin; gonapophyses with ventral valve broad basally, outer valve broadened subapically; paraproct of ♀ with a median transverse row of 6 long setae; penis frame with inner parameres fused to a keel-like structure, with triradiate radula sclerite; tergite 9 of ♂ long, with apical comb of small teeth, anterolateral groups of tubercles, and lateral band of sclerotization. *E. fenestratus*, *E. erosus*.

Denervus group: Sexual dimorphism apparent in antennal and eye characteristics; fore wing setae on vein fairly long, margin with extra row of setae between *sc* and m_1; hind wing marginal setae between *r* fork; subgenital plate with apical lobes rounded, each with 3–4 setae; gonapophyses with ventral valve broad and rounded basally, outer valve short, broad; paraproct of ♀ with a median transverse row of 4–5 long setae; penis frame with inner parameres fused to a broad structure, tergite 9 of ♂ broad, with straight apical comb. *E. denervus*, *E. amblyura*.

Dicroglossus group: ♀ unknown; eyes large, fore wing margin with extra row of setae from *sc* to r_{4+5} or m_1; hind wing marginal setae between *r* fork; penis frame with rake-like median portion of inner parameres detached; tergite 9 of ♂ very broad, with apical comb of small teeth. *E. dicroglossus*, *E. adelphos*.

Denotatus group: ♂ unknown. Fore wing margin bare, setae on veins microscopic; pterostigma broader basally; subgenital plate with apical lobes truncate, each with 2 stout apical setae, main plate with 12 subapical setae; gonapophyses with ventral valve narrow, outer valve broadly triangular; paraproct of ♀ with 6 trichobothria and no long setae; *E. denotatus*.

Titschacki group: ♂ unknown; fore wing margin with extra row of setae from *sc* to r_{4+5} or m_1; hind wing bare; subgenital plate with apical lobes triangular, each with 3 setae, all stout or 1 stout and 2 finer; gonapophyses with ventral valve narrow, outer valve with lateral margins straight; paraproct of ♀ with a median transverse row of 4 long setae. *E. titschacki*, *E. argus*, *E. amphithrix* (hind wing marginal setae between *r* fork), *E. innotatus* (hind wing marginal setae between *r* fork).

Cinctus group: Sexual dimorphism slight; fore wing marginal setae with extra row from *sc* to r_{4+5} or m_1; membrane darker at apices of m_3 and cu_1; *r* fork more than 2× as long as stem; hind wing bare; subgenital plate with apical lobes triangular, inner margins parallel; ventral valve of gonapophyses narrow, outer valve bent laterally; spermatheca and duct sclerotized, persistent in some species; paraproct of ♀ with a median transverse row of 5 long setae usually; hypandrium large with sclerotized apical knob and anterior perpendicular ridge; penis frame tubular, doubly bent, large; tergite 9 of ♂ vase-shaped, apical comb straight; *E. cinctus*, *E. salpinx*, *E. separatus*, *E. triangulus*, *E. paraplesius*, other assignable species *E. vilheni*, *E. halcrowi*.

Maindroni group: Sexual dimorphism apparent in thickness of antenna only; fore wing darkened along m_2, m_3 and cu_1; hind wing marginal setae very fine, very short, few; subgenital plate with apical lobes truncate, convergent, each with 2 stout apical and 1 fine lateral seta; gonapophyses with ventral valve narrow, outer valve lateral margins straight; paraproct of ♀ with a median transverse row of usually 4 long setae; hypandrium with lateral projections; penis frame tubular in some

Table 29. Key to species numbers used in numerical taxonomic analysis.

Ectopsocus

sp. No. 1 = *villosus*	sp. No. 42 = *separatus*
sp. No. 2 = *ornatoides*	sp. No. 43 = *paraplesius*
sp. No. 3 = *denervus*	sp. No. 44 = *gradatus*
sp. No. 5 = *fenestratus*	sp. No. 45 = *furcatus*
sp. No. 6 = *marginatus*	sp. No. 46 = *triangulus*
sp. No. 7 = *thysanus*	sp. No. 48 = *gracilis*
sp. No. 11 = *comptus*	sp. No. 49 = *denotatus*
sp. No. 13 = *uncinatus*	sp. No. 50 = *intersitus*
sp. No. 14 = *speciosus*	sp. No. 51 = *innotatus*
sp. No. 15 = *nidicolus*	sp. No. 52 = *amphithrix*
sp. No. 16 = *cristatus*	sp. No. 53 = *tenellus*
sp. No. 17 = *dialeptus*	sp. No. 54 = *fumidus*
sp. No. 18 = *punctatus*	sp. No. 55 = *argus*
sp. No. 21 = *crinitus*	sp. No. 57 = *comitus*
sp. No. 22 = *salpinx*	sp. No. 70 = *zimmermani*
sp. No. 23 = *amblyura*	sp. No. 71 = *ignotus*
sp. No. 24 = *svictus*	sp. No. 72 = *adelphos*
sp. No. 26 = *spilotus*	sp. No. 74 = *baliosus*
sp. No. 29 = *decoratus*	sp. No. 75 = *cirratus*
sp. No. 30 = *pilosus*	sp. No. 76 = *vannus*
sp. No. 41 = *boharti*	sp. No. 77 = *dicroglossus*

Ectopsocopsis

sp. No. 58 = *cognatus*

Peripsocus

sp. No. 32 = *ferrugineus*	sp. No. 66 = *brachyura*
sp. No. 33 = *nitens*	sp. No. 69 = *stenopterus*
sp. No. 39 = *hongkongensis*	sp. No. 78 = *crenulatus*
sp. No. 61 = *circinus*	sp. No. 79 = *denticulatus*
sp. No. 62 = *selene*	sp. No. 80 = *constrictus*
sp. No. 63 = *stigmatus*	sp. No. 81 = *hiatus*
sp. No. 65 = *valvulus*	sp. No. 82 = *anoplus*

species; tergite 9 of ♂ as broad as long, apical comb with teeth in 2 groups. *E. maindroni, E. marginatus, E. uncinatus, E. intersitus.*

Pumilis group: Sexual dimorphism apparent in thickness of antenna and size of eye; fore wing with extra row of marginal setae from *sc* to m_1; hind wing bare; subgenital plate with 2 long narrow convergent apical lobes and a small, low median lobe; gonapophyses with ventral valve narrow, outer valve with lateral margins straight; penis frame with inner parameres fused and with apicolateral thimble-like appendages; tergite 8 with small median posterior lobe and 3 small groups of tubercles; tergite 9 of ♂ vase-shaped, apical comb straight. *E. pumilis.*

Briggsi group: Sexual dimorphism marked, evident in antennal and eye characteristics; fore wing with extra row of marginal setae from *sc* to m_1; small pigmented spots at *rs-m* junction and at apices of veins; hind wing marginal setae between *r* fork; subgenital plate with 2 long narrow apical lobes curved mesially and a small, low median lobe, apical lobes each with 3 fine subapical setae; gonapophyses with ventral and dorsal valves reduced; paraproct of ♀ with median transverse row

Fig. 297. The distribution of some Peripsocid species-groups in the Oriental Region and the Pacific.

of 3–4 long setae; penis frame with inner parameres fused and with apicolateral thimble-like appendages; tergite 8 of ♂ with 3 groups of tubercles; tergite 9 of ♂ vase-shaped, apical comb straight. *E. briggsi*, *E. punctatus*, *E. meridionalis* (parthenogenetic), *E. gracilis* (dorsal valve absent), other assignable species *E. congener*.

Hirsutus group: Sexual dimorphism apparent in thickness of antenna only; femur of all legs broad; setae on fore wing veins and margin stout, long, margin with extra row between *sc* and r_{4+5} or m_1; *r* fork wide, *m* displaced towards posterior margin; hind wing with marginal setae between r_1 and r_{4+5}; subgenital plate with 1 apical lobe carrying 6–8 stout apical setae; gonapophyses with ventral valve broad, rounded at base; outer valve broadened subapically; paraproct of ♀ with median transverse row of 4 long setae; hypandrium with lateral hooks; penis frame with radula sclerites; tergite 9 of ♂ always with subapical group of tubercles, often with apical row of tubercles also. *E. hirsutus*, *E. pilosus*, *E. thysanus*, *E. villosus*, *E. richardsi* (brachypterous), *E. crinitus* (hind wing marginal setae between *r* fork), *E. boharti* (hind wing marginal setae between *r* fork, femur not broadened).

Quercicola group: Fore wing slightly patterned; subgenital plate sclerotization broad V- or U-shaped; apical lobe as broad as long with fairly uniformly distributed fine setae; gonapophyses with ventral valve narrow, apex tapering, dorsal valve longer than broad, narrower apically, outer valve reduced; penis frame slipper-shaped or square anteriorly; tergite 9 with median apical lobe size variable, with or without teeth. *P. quercicola*, *P. pseudoquercicola*, *P. hongkongensis* (outer valve not very reduced).

Similis group: Fore wing usually with cloudy irregular pigment; subgenital plate with apical lobe with apical setae; gonapophyses with ventral valve narrow, tapering, dorsal valve as broad as long, with apical spines, outer valve well developed; probably parthenogenetic in some species. *P. similis*, *P. pauliani*, *P. stigmatus*.

Reicherti group: Fore wing with a large brown area at center of wing, at base and at apex; subgenital plate with sclerotization broad V-shaped, apical lobe setae fairly long, apical; gonapophyses with ventral valve relatively broad, constricting apically, apical recurrent setae relatively large, spine-like, dorsal valve long, narrower in apical 1/2, outer valve reduced. *P. reicherti*, *P. brachyura*, *P. valvulus*.

DISTRIBUTION OF SPECIES-GROUPS

The distribution of several species-groups in the Oriental Region and the Pacific is shown in fig. 297. In this map, several groups which are widespread in the Pacific have been omitted—the *Ectopsocopsis* species, the *hirsutus*, *denervus*, *briggsi* and *maindroni* groups of the *Ectopsocus*.

The grouping of *Peripsocus* species is relatively difficult, as a number of species do not fall into such compact species-groups as do the *Ectopsocus* species. However, 3 relatively stable species-groups are recognizable. The *quercicola* group consists of *P. quercicola* found in India, Hong Kong, Macao, Taiwan, Malaya and Japan, *P. pseudoquercicola* and *P. hongkongensis* both reported only from Hong Kong. The *similis* group, known from females only, consists of *P. similis*, found in Hong Kong, Singapore, and the Hawaiian Is., *P. pauliani*, described from African specimens and represented in Hong Kong, Malaya, the Philippines and Micronesia (except the Gilberts), and *P. stigmatus* from Malaya. The *reicherti* group, of which only females have been studied, includes *P. reicherti* which occurs in Malaya and Java (it is also found in the Seychelles), *P. valvulus*, recorded only from Malaya, and *P. brachyura* from Palawan.

Peripsocus species, on the whole, are not well represented in the Pacific as compared with *Ectopsocus* species. Only in Hong Kong and in Malaya is there about the same number of *Peripsocus*

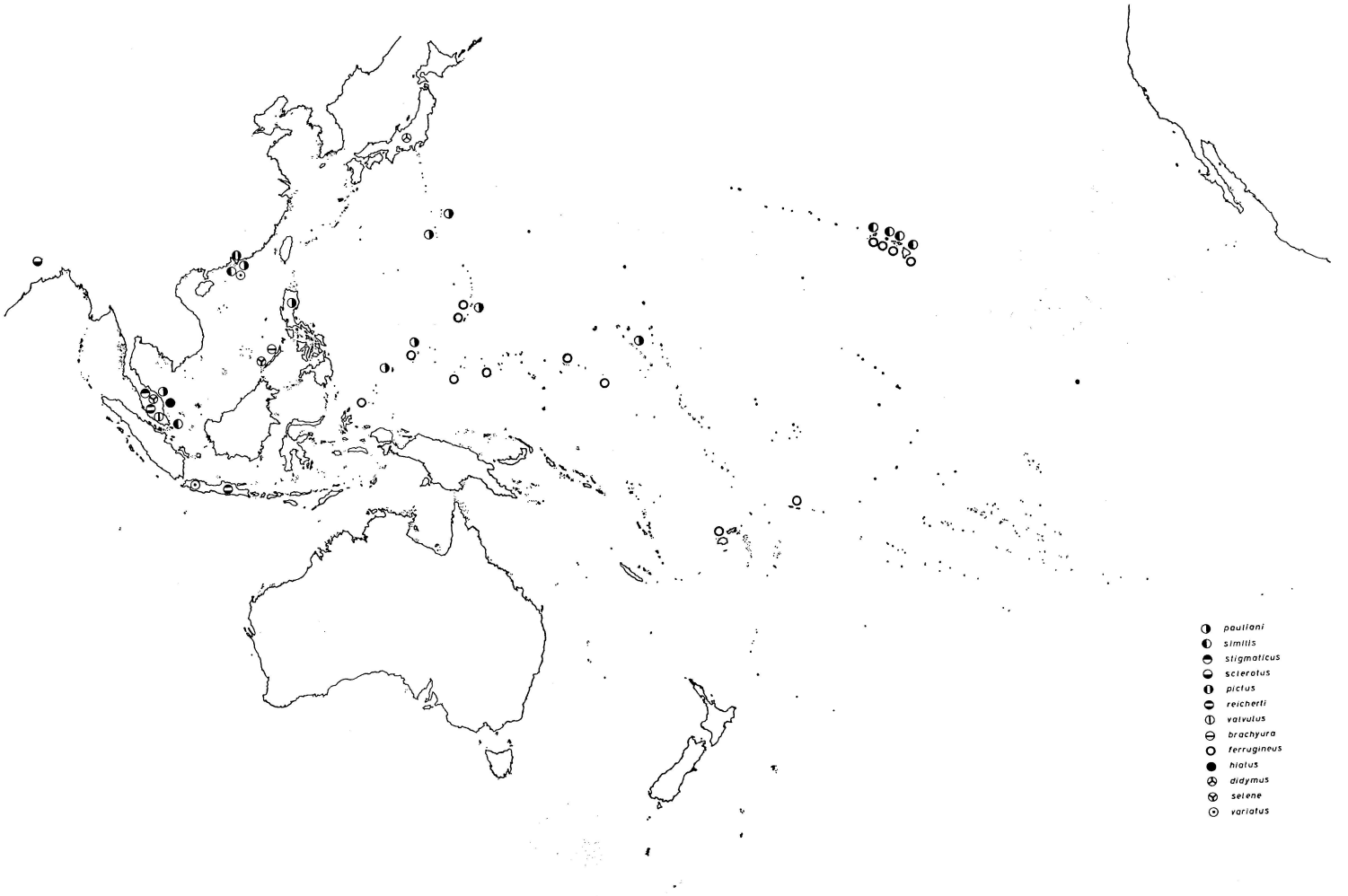


Fig. 298. The occurrence of some *Peripsocus* species in the Oriental Region and the Pacific.

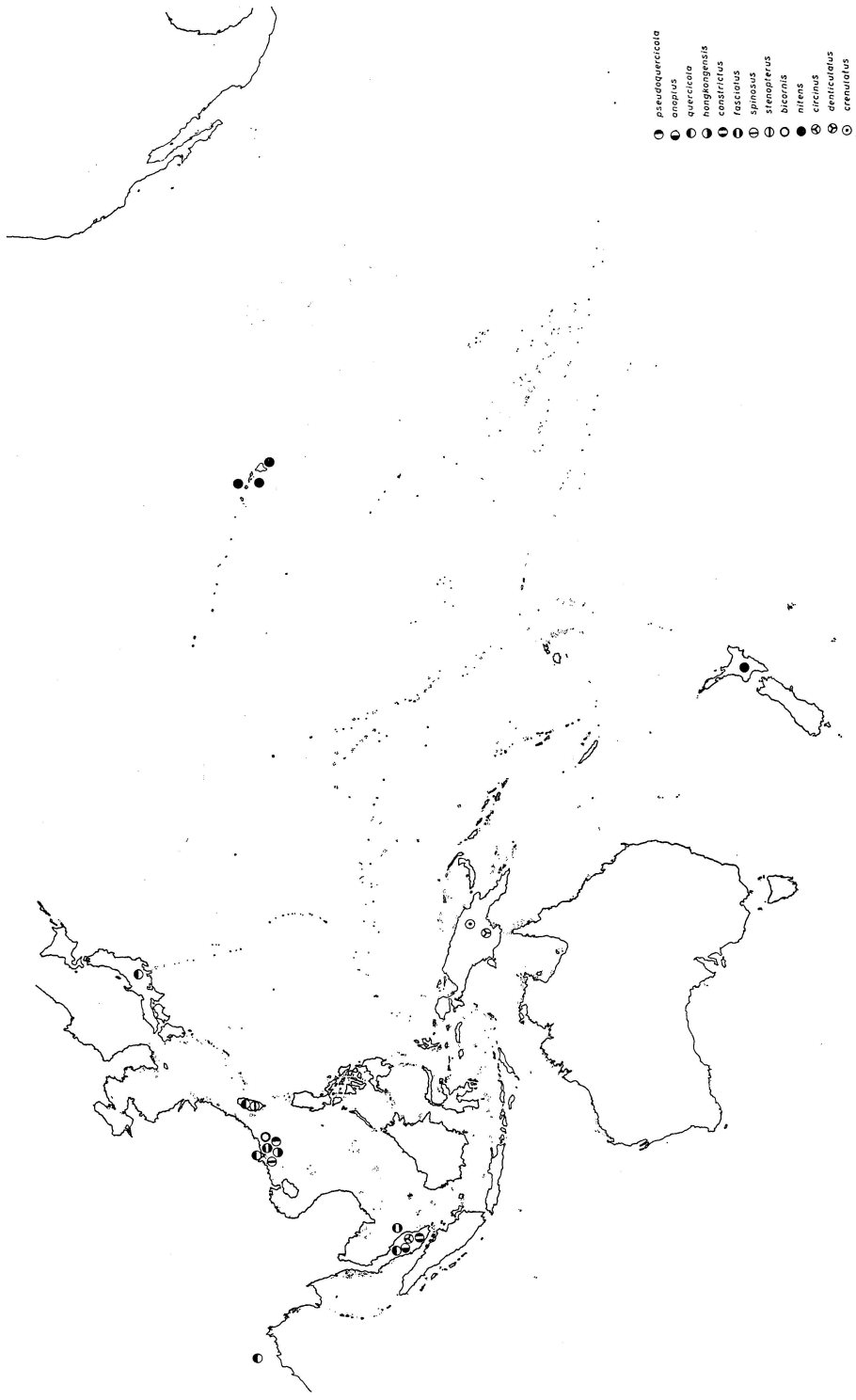


Fig. 299. The occurrence of some *Peripsocus* species in the Oriental Region and the Pacific.

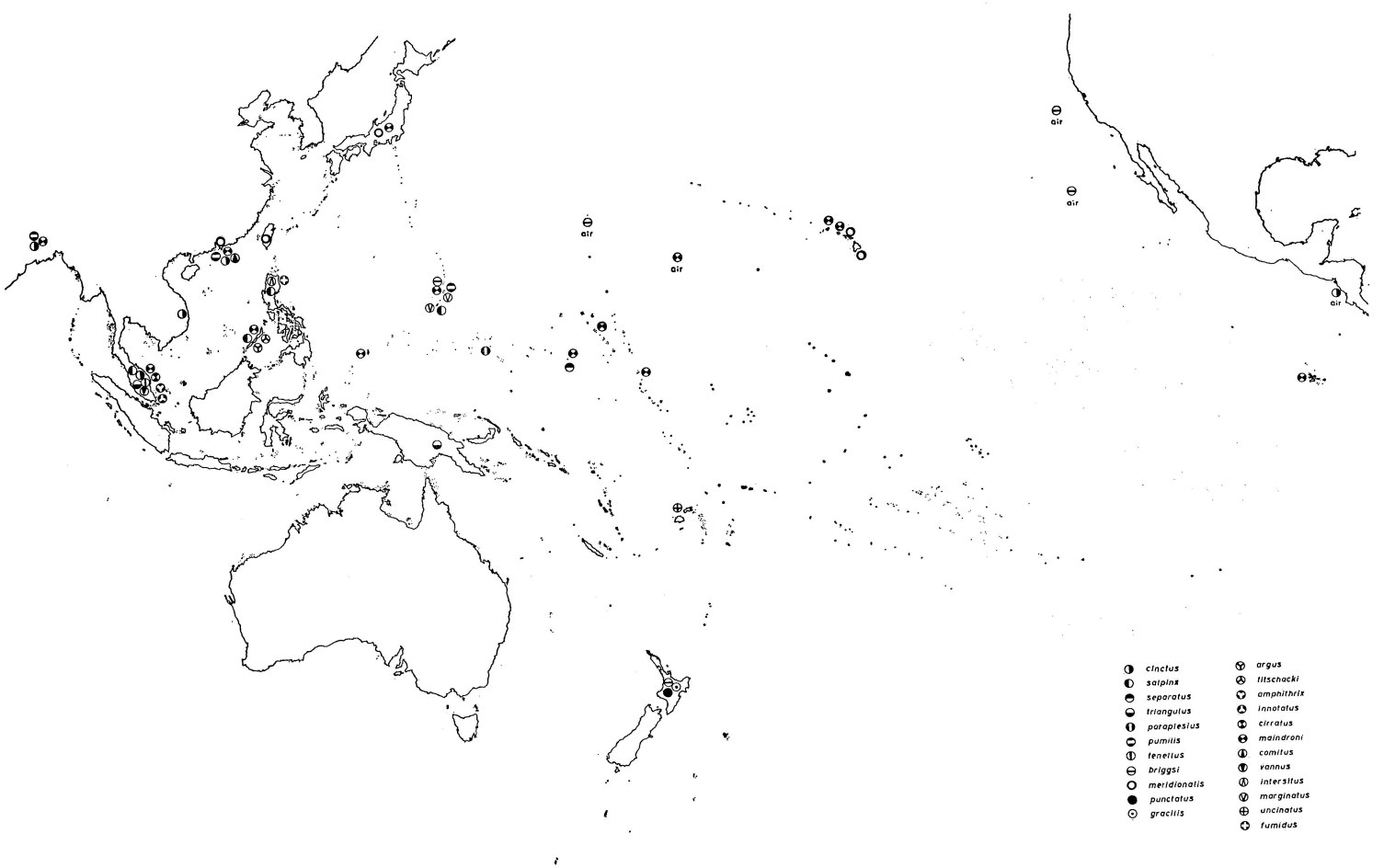


Fig. 300. The distribution of species of the *Ectopsocus briggsi* complex in the Oriental Region and the Pacific.

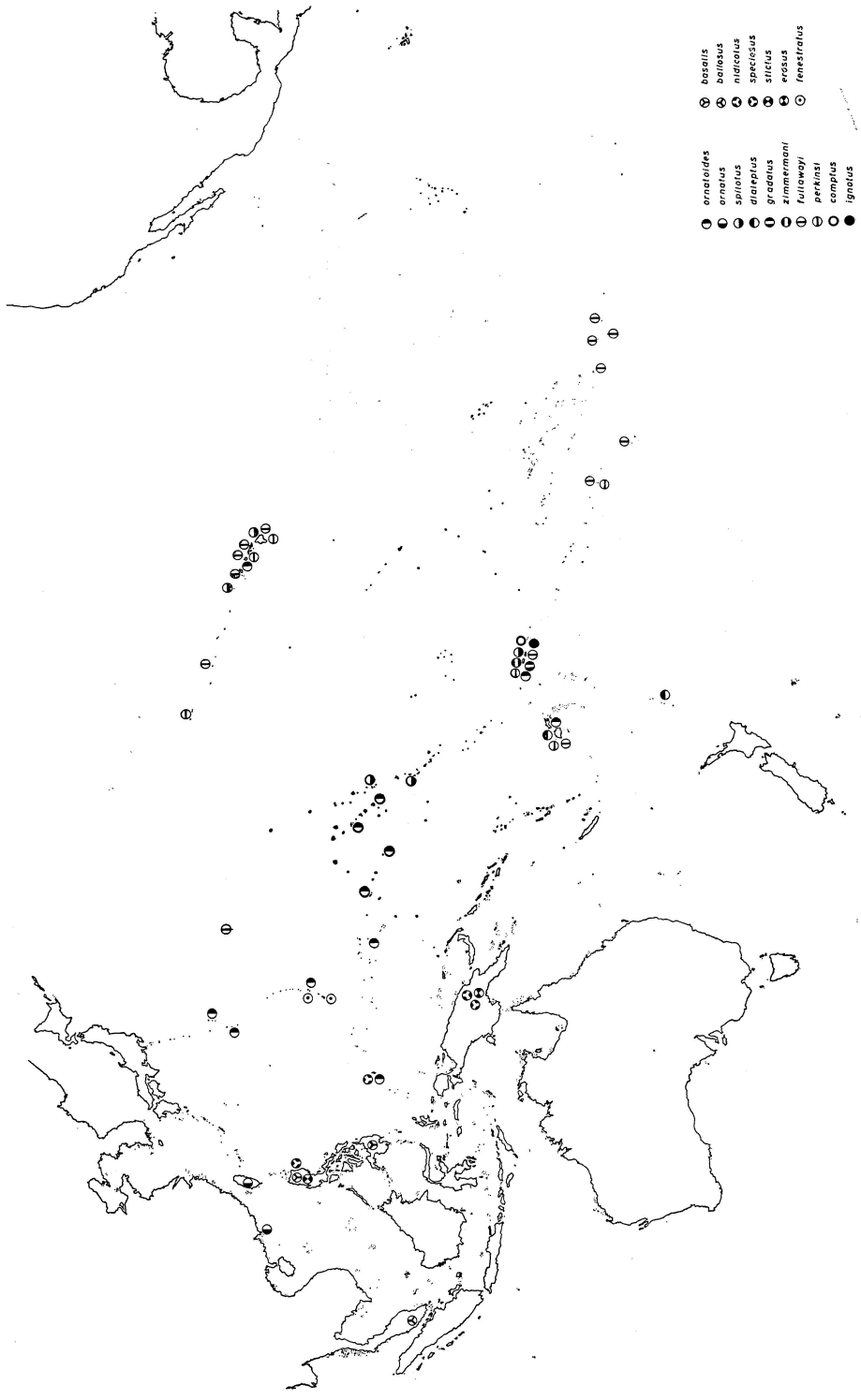


Fig. 301. The distribution of species of the *Ectopsocus ornatus* complex in the Oriental Region and the Pacific.

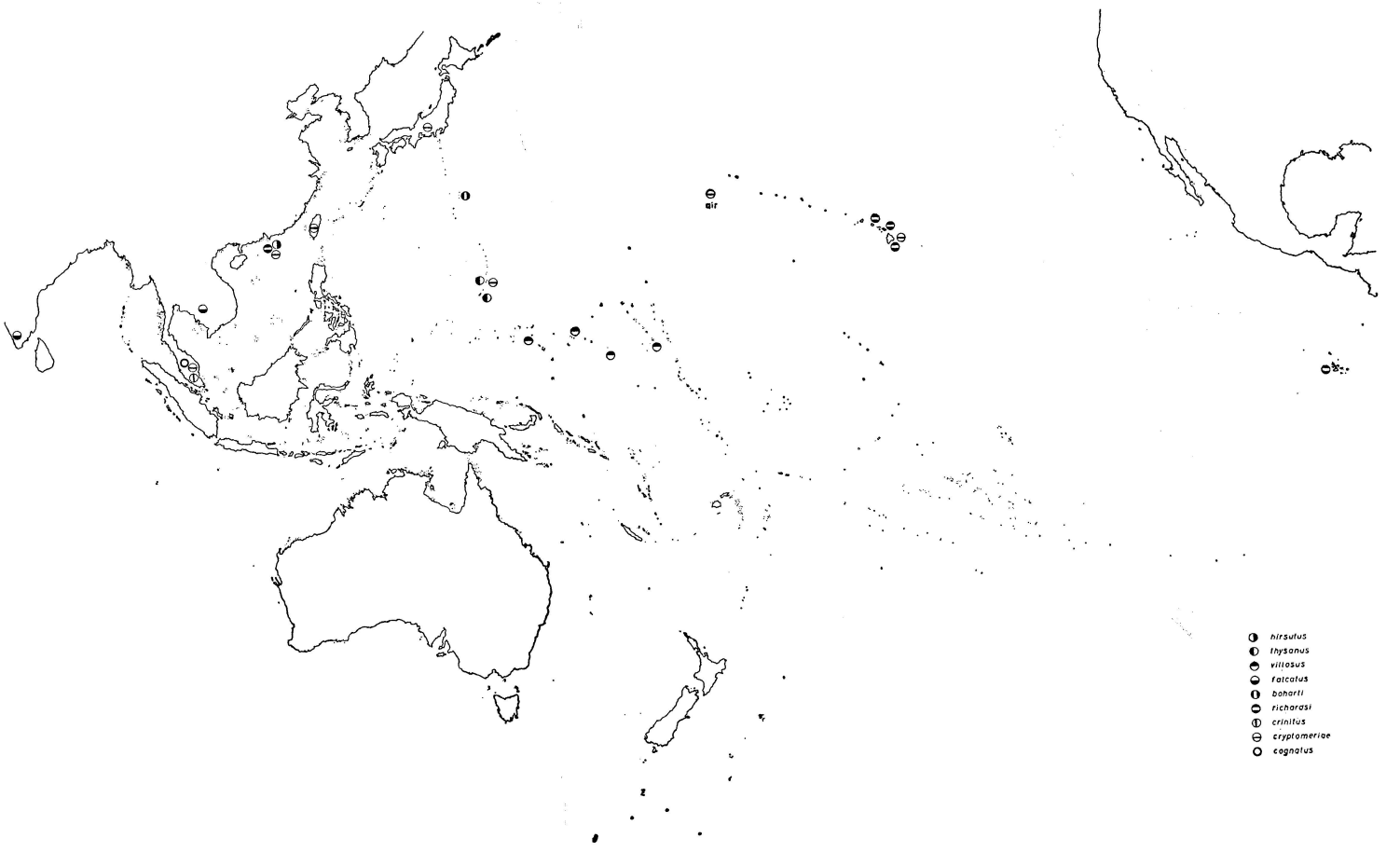


Fig. 302. The distribution of *Ectopsocopsis* species (*cryptomeriae*, *cognatus*) and species of the *Ectopsocus hirsutus* group in the Oriental Region and the Pacific.
NB—◒ *falcatus* should read ○ *pilosus*

species as *Ectopsocus* species; elsewhere, there are much fewer species of *Peripsocus*. Of the *Peripsocus* species studied, 4 are widespread in the region considered in this study: *P. quercicola*, *P. similis*, *P. pauliani* and *P. ferrugineus*, and 11 (42%) are represented in the collections by 1 specimen only. These data are regarded as inadequate for a proper consideration of distribution patterns of species or species-groups of *Peripsocus*; the recorded occurrences to date, however, are plotted in fig. 298 and 299. More distribution records are needed.

In contrast to *Peripsocus*, the majority of the species of *Ectopsocus* considered in this work are clearly assignable to 3 major assemblages: the *briggsi* complex, the *ornatus* complex, and the *hirsutus* group. These are considered and their group distribution mapped below.

The *briggsi* complex of *Ectopsocus*, consisting of the *briggsi*, *pumilis*, *cinctus*, *maindroni* and *titschacki* groups, has representatives in Africa, the Oriental Region, the Pacific, and several cosmopolitan species. The distribution of this complex is shown in fig. 300. The *briggsi* group itself contains the 2 widespread species *E. briggsi*, (which, however, has not yet been recorded from the Oriental Region) occurring in this region in the Marianas and New Zealand, and *E. meridionalis* which occurs in Hong Kong, Taiwan, Japan and the Hawaiian Islands. The remaining 3 species of the group considered here, *E. congener*, *E. punctatus*, *E. gracilis*, occur in New Zealand, *E. congener* also in Tasmania. The *pumilis* group consists of *E. pumilis* (widespread) represented in this region in India, Hong Kong, and the Marianas, and *E. tenellus*, found only in Malaya. The *cinctus* group, which has representatives in Africa, is represented in this region by *E. cinctus* which is confined to continental Asia, *E. salpinx* which extends also to Palawan and the Marianas, *E. separatus* and *E. paraplesius* (Carolines), and *E. triangulus* (Malaya and New Guinea). The group thus extends into the Pacific only as far as Micronesia. The *maindroni* group contains *E. maindroni* (widespread), which extends from continental Asia across the Pacific, *E. marginatus*, found only in the Marianas, *E. uncinatus*, recorded from Fiji only, and *E. intersitus* from the Philippines. The *titschacki* group comprises *E. titschacki* (recorded from S. America and Africa) represented in this area in Palawan, and *E. amphithrix* and *E. innotatus* (Malaya).

The *ornatus* complex of *Ectopsocus*, consisting of the *ornatus*, *fullawayi*, *perkinsi*, *basalis*, *fenestratus* and *denervus* groups is essentially Pacific in distribution (fig. 301) with but 2 representatives on the Asian continent (*E. ornatus* and *E. baliosus*), and there is only 1 known species outside the Oriental Region and Pacific area which is possibly assignable to this complex, *E. pearmani* from Africa. The *ornatus* group itself, consists of *E. ornatus*, known from Hong Kong and Taiwan, *E. ornatoides*, represented in Micronesia (except the Gilberts), Fiji, Samoa and the Hawaiian Islands, *E. spilotus*, recorded from Micronesia (the Marshalls and the Gilberts), Fiji, Samoa and the Hawaiian Islands, and *E. dialeptus*, known from the Kermadecs only. This group is thus mainly Pacific, east of Micronesia, with only *E. ornatus* itself occurring on continental Asia. The *fullawayi* group consists of *E. fullawayi* (Wake, Australs, Rapa, Tuamotu Archipelago, Fiji, Samoa, and the Hawaiian Islands) and *E. comptus* and *E. gradatus* both from Samoa. This group is strictly Pacific and is apparently found only east of Micronesia. The *perkinsi* group includes *E. perkinsi* (with a similar distribution to *E. fullawayi*) and possibly also *E. pearmani* from Africa (not recorded from this area). The *basalis* group consists of *E. basalis* from the Philippines, *E. nidicolus* from New Guinea, *E. speciosus* from the Philippines, New Guinea and the Carolines, *E. stictus* from the Philippines, and *E. baliosus* from Malaya. The distribution of this group thus extends into the Pacific as far as Micronesia but no further. The *fenestratus* group is represented by *E. fenestratus* (the Marianas) and *E. erosus* (New Guinea).

The species of the *hirsutus* group, the distribution of which is shown in fig. 302, exhibit species replacement, not more than 1 species being present in any 1 area (with the exception of *E. richardsi* which is known to infest houses and may be propagated by human agency). *E. pilosus* is found in India and Cambodia, *E. hirsutus* in Hong Kong, *E. crinitus* in Malaya, *E. boharti* in the Bonins, *E.*

thysanus in the Marianas and *E. villosus* in the Carolines and Marshalls. *E. richardsi* has been found in this region in Hong Kong, the Hawaiian Islands and the Galapagos Archipelago. This group has representatives in Africa, e.g. *E. coccophilus*, and is widespread in Asia, extending into the Pacific only as far as Micronesia, with the exception of the cosmopolitan *E. richardsi*.

The groups *dicroglossus* (2 species in New Guinea) and *denotatus* (1 species in Vietnam) are not readily assignable to any complex.

In spite of the numerical taxonomic results, certain species represented by only 1 sex are not assigned to species-groups for purposes of distributional analysis, pending information from the other sex.

As far as *Ectopsocus* is concerned then, the groups comprising the *briggsi* complex are, in general, not well represented in the Pacific (fig. 300). Those species which occur on Pacific islands are mainly cosmopolitan forms. There has apparently been very little speciation in these groups in the Pacific. In contrast, the *ornatus* complex is well represented in the Pacific (fig. 301), 2 species-groups being represented only on Pacific islands and 4 occurring also on continental islands. Only 2 of the 17 species of this fairly closely related complex which are considered here occur on the Asian mainland (1 in Hong Kong, 1 in Malaya), and 1 species reported from Africa, probably assignable to the complex is not represented in the Oriental Region or the Pacific. The *hirsutus* group is mainly continental and subcontinental (fig. 302), its distribution extending into the Pacific only as far as Micronesia (except for the cosmopolitan *E. richardsi*). This group also exhibits the phenomenon of species replacement.

The distinctive distribution patterns of the species complexes and groups of *Ectopsocus* thus support the classification arrived at by using large numbers of phenotypic characters.

ACKNOWLEDGMENTS

This work was supported by research grants from the University of Hong Kong.

The collections dealt with in this paper were made available by B. P. Bishop Museum, Honolulu Hawaii, U. S. Medical Research Unit, Kuala Lumpur; Dr. S. S. Lee, Fisheries Research Institute, Glugor, Penang; Dr E. L. Mockford, Department of Biological Science, Illinois State University, Normal, Illinois, and Mr A. M. Nadler. We wish to thank the above institutions and colleagues for their generous cooperation.

Field research and survey in Micronesia was made possible through the efforts of the U. S. Office of Naval Research, the Pacific Science Board (National Research Council), the National Science Foundation, Chicago Natural History Museum, and Bishop Museum. This project was aided by a contract between the Office of Naval Research, Department of the Navy and the National Academy of Sciences, NR 160–175. Results of fieldwork in New Guinea was supported by grants to Bishop Museum from the National Institutes of Health and the National Science Foundation.

Our thanks are also due the following collectors; M. N. Adal, P. A. Adams, C. R. Baltazar, R. M. Bohart, J. C. Buff, E. H. Bryan, Jr., D. Q. Cavagnaro, C. F. Clagg, J. F. G. Clarke, A. Cunningham, H. S. Dybas, F. R. Fosberg, R. J. Goss, J. L. Gressitt, E. Hagen, J. Hidalgo, N. L. H. Krauss, I. La Rivers, S. S. Lee, T. C. Maa, Ann H. Nadakavukaren, A. M. Nadler, C. W. O'Brien, L. Palmer, R. W. L. Potts, L. W. Quate, Rabors & Gonzales, K. Ross, C. W. Sabrosky, G. A. Samuelson, E. Schlinger, R. O. Schuster, J. F. Shoen, N. R. Spencer, C. E. Stegmaier, O. H. Swezey, H. K. Townes, R. L. Usinger, H. S. Wallace, N. Wilson, K. Wise, H. Woolford, K. Yasumatsu, M. Yossii and E. C. Zimmerman.

We would like to thank Mr Y. H. Chan, Miss V. Chui and Dr S. S. Lee for their collaboration in collecting in Hong Kong.

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